

AGRICULTURAL

Chemicals

IN THIS ISSUE:

Nitrogen Losses

Grain Fumigation

New Pesticides

Fertilizer Caking

New Ag Plane

WAGS

Illinois Centennial

MAY, 1958



**Multiwall
Paper Bags**
by

BAGPAK

International Paper Company

The name BAGPAK is a standard of leadership, and of quality...for BAGPAK means *complete* production control in bag manufacture, from the planting of seedlings which eventually produce pulp, to the delivery of the finished sack to your plant—in fact, even to the furnishing of special filling and closing machines to insure the best protection for your product.

INTERNATIONAL

BAGPAK DIVISION



PAPER

NEW YORK 17, N. Y.

Progress Report

POTASH COMPANY OF AMERICA, LTD.

No other Canadian Potash installation whose plan has been announced will be nearly as large as PCA's initial installation in the province of Saskatchewan

Meanwhile our Carlsbad Plant can serve your entire POTASH requirements with the very best material.

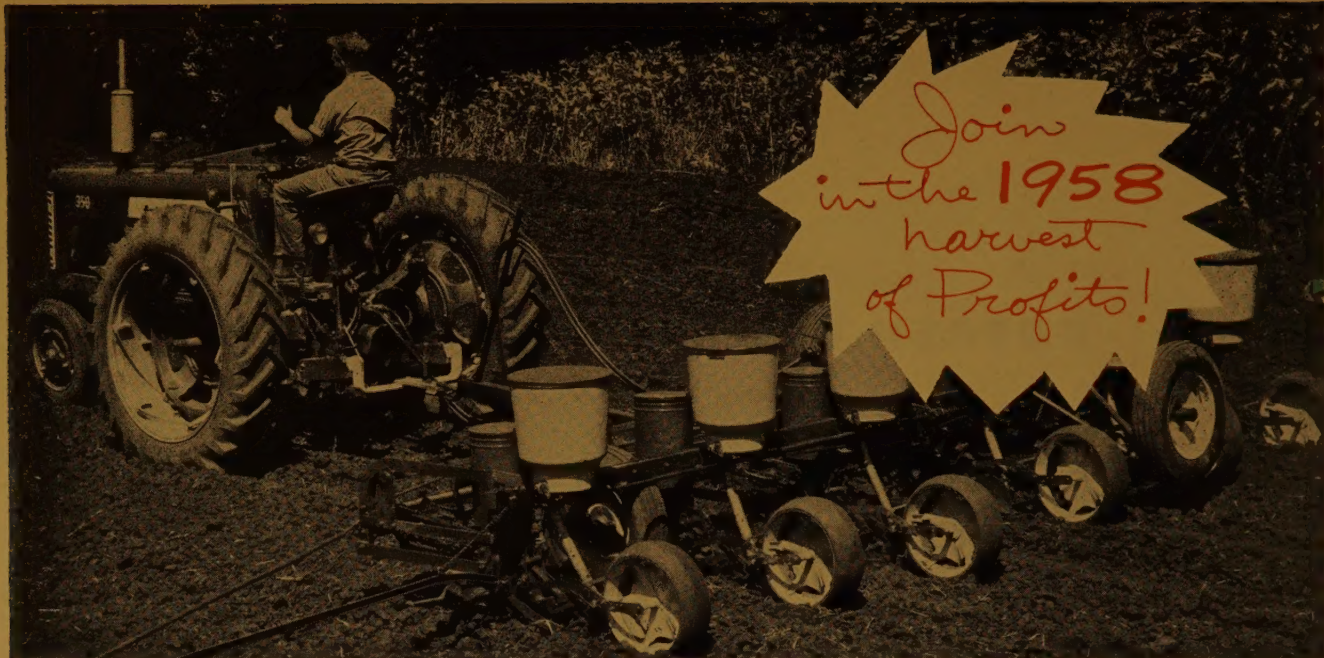
New 60% Standard Muriate
New 60% Special Granular Muriate
New 60% Coarse Granular Muriate
Sulphate of Potash
Chemical Muriate — 99.9% KCL minimum

Quick Service — High Quality
Phone, write, telex, or wire us.
Phone STerling 3-4990, Washington
TWX No. — WA-331.



POTASH COMPANY OF AMERICA CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.



HEPTACHLOR

is "planting" more sales support than ever before!

COMPREHENSIVE DEALER PROGRAM! In 1958, Heptachlor is being backed by the most comprehensive merchandising campaign ever developed to promote insecticide sales. There is a complete Insecticide Dealer Program that includes a "Salesmen's Insect Control Refresher Course"; a monthly information service; free listing in Velsicol's local advertising; listing in a "sources of supply" bulletin; and Insect Control Guide Sheets.

COUNTY AGENT PROGRAM! A special program, called the "Heptachlor Insect Control Forum," is being conducted for agricultural leaders. This program includes a monthly information service, insect control guide sheets, and the special consultant services of Velsicol Entomologists.

MORE THAN 20 REGIONAL MERCHANDISING PROGRAMS! More than 20 separate regional merchandising programs are promoting the use of Heptachlor in all parts of the country. Each of these programs includes advertising, dealer support, and promotional materials. Each is designed for specific crops and

insects, and timed to coincide with local recommendations for the use of Heptachlor. Here is a list of these programs:

WEST

Alfalfa Weevils
Soil Insects
Grasshoppers

SOUTH

Cotton Insects
Tobacco Insects
Peanut Insects
Soil Insects, Corn
Soil Insects, Potatoes
Soil Insects, Nursery Stock
Soil Insects, Truck Crops
Rough Headed Corn Stalk Beetles
Sweet Potato Weevils
Sugar Cane Insects

CENTRAL

Soil Insects
Forage Insects
Bluegrass Bugs
Tobacco Insects
Sweet Clover Weevils
Grasshoppers

EAST

Forage Insects
Soil Insects
European Chafer

HEPTACHLOR VERSATILITY! Heptachlor is used wherever crops are grown, because of its effectiveness and versatility. It is America's leading soil insecticide, and can also be used on forage crops without danger of milk or meat contamination. Heptachlor controls more than 75 soil and leaf feeding insects on all major crops, and is safe, easy, and economical to use!

FOR BIGGER INSECTICIDE SALES IN 1958, PUSH HEPTACHLOR

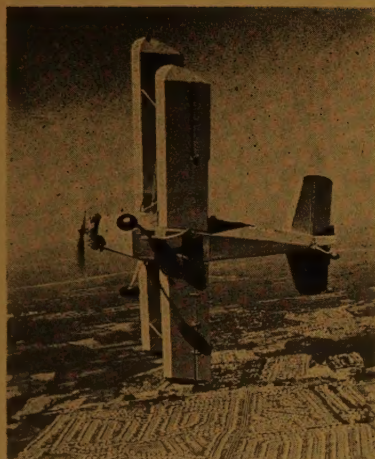
HEPTACHLOR CHLORDANE PARATHION METHYL PARATHION GIBBERELLINS EMMI ENDRIN



VELSICOL CHEMICAL CORPORATION

330 East Grand Ave., Chicago 11, Illinois

International Representative: Velsicol International Corporation, C.A. • P. O. Box 1687 • Nassau, Bahamas, B.W.I.



This Month's Cover

The "Grumman "Ag-Cat", a new plane for the aerial application of insecticide and fertilizer dusts and sprays, is described in the new Custom Applicator section featured in this issue. Page 58.

Publisher
Wayne E. Dorland

Editor
Eleonore Kanar

Associate Editor
Richard McNally

Advertising Manager
Ralph Dorland

District Managers
Roger Appleby
Ralph Clarke Williams

Circulation Manager
David Tryon

Editorial Advisory Board
Dr. Alvin J. Cox
Lea S. Hitchner
Dr. S. E. A. McCallan
Dr. Charles Palm
Dr. Colin W. Whittaker



Vol. 13, No. 5

May, 1958

AGRICULTURAL

Chemicals

ARTICLES

NITROGEN LOSSES IN AMMONIATION (Part 3)	32
<i>G. F. Sachsels, Elmer Perrine, T. P. Hignett</i>	
GRAIN FUMIGATION	35
PHOTOMICROGRAPHIC EVALUATION OF DIATOMITES	
ON AMMONIUM NITRATE FERTILIZERS	39
<i>By F. L. Kadey, Jr.</i>	
WHAT'S NEW IN PESTICIDES (Part 2)	42
THE GRUMMAN "AG-CAT"	58
WASHINGTON ASSOCIATION OF GROUND SPRAYERS	63
<i>By Jennings Felix</i>	
SOUTHEASTERN LIQUID FERTILIZER CO. APPLICATOR SERVICE	71
ILLINOIS NATURAL HISTORY SURVEY CENTENNIAL	75

FEATURES

INDUSTRY CALENDAR	9
IN THE SPOTLIGHT THIS MONTH	9
TRADE ASSOCIATION LISTING	16, 119
EDITORIAL	31
WASHINGTON REPORT	44
<i>By Donald Lerch</i>	
FERTILIZER VIEWS AND NEWS	46
<i>By Vincent Sauchelli</i>	
TECHNICAL SECTION	48
THE CUSTOM APPLICATOR	55
PEST ROUNDUP	67
<i>By Kelvin Dorward</i>	
THE LISTENING POST	77
<i>By Paul Miller</i>	
INDUSTRY NEWS	78
SUPPLIERS BULLETINS	104
PROFESSIONAL DIRECTORY	119
CLASSIFIED ADVERTISING	121
ADVERTISER'S INDEX	123
TALE ENDS	124

PUBLISHED monthly on the 1st, by Industry Publications, Inc.

ADVERTISING and Editorial Office, P. O. Box 31, Caldwell, New Jersey.

PUBLICATION Office: 123 Market Pl., Baltimore, Md.

ENTERED as second-class matter November 4, 1949 at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

SUBSCRIPTION RATES: United States, 1 year, \$3.00; 2 years, \$5.00. Canada and Pan American countries, 1 year, \$4.00; 2 years, \$7.00. All other foreign countries, 1 year, \$9.00; 2 years, \$15.

1 year, \$4.00; 2 years, \$7.00. All other foreign countries, 1 year, \$9.00; 2 years, \$15.

SINGLE COPIES: current issue: \$0.50; all back numbers \$1.00. Postage and handling charges for foreign countries on single copies: \$1.00. Claims for missing numbers will not be allowed if received more than 60 days from date of mailing. No claims allowed from subscribers arising from failure to notify the Circulation department of a change of address, or because a copy is "missing from files."

ADVERTISING RATES known on request. Closing date for copy—5th of month preceding month of issue.

Portals of progress

— for the benefit of agriculture

Modesto Agricultural Laboratory, Modesto, California

The doors of Shell Development Company's completely modernized and expanded facilities at Modesto, California, officially opened April 17, 1958. This new installation is dedicated to the intensive study of pesticides—not only for agriculture, but also for pests that harass the general public in homes, gardens, recreation areas and in industry.

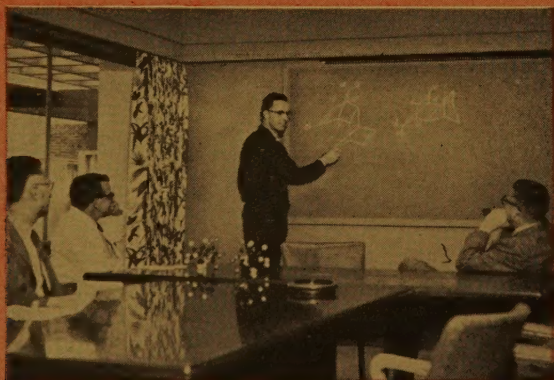
The Modesto Agricultural Laboratory ranks among the foremost installations of its type in the world. Its organizational make-up is comprised of four groups: Biological Research; Chemical Research; Service; and Products Application. All four groups are co-ordinated under one Director.

The facilities include modern, well-equipped laboratories, an up-to-date reference library, five spacious greenhouses and a 142-acre ex-

perimental farm. After preliminary laboratory study is completed, Shell researchers can then conduct field tests and further experiments to prove new products under authentic farming conditions.

Shell pesticides now in successful use in every agricultural area include aldrin, dieldrin, endrin, methyl parathion and Phosdrin® Insecticides; allyl alcohol weed seed killer; D-D® and Nemagon® Soil Fumigants. The new additions to the Modesto Agricultural Laboratory promise the continued development of new, easier-to-use and more effective weapons for the continuing battle against crop-destroying pests.

Shell Chemical Corporation looks to a brighter tomorrow for agriculture through chemical research today.



This modern conference room adjoins Director's office. Here department heads attend regular meetings. They work as a team to discuss and resolve field and laboratory research problems.



Laboratories contain the most modern, scientific equipment available. When preliminary tests are completed, researchers can then move out to the 142-acre farm for further proving under actual farming conditions.

For technical information on Shell Chemical products, write to:

in pesticide research



One of five spacious greenhouses. Horticulturists, shown here working with a test spray, are conducting an experiment with root rot on pinto beans in naturally infested and diseased soil.



Personnel have at their disposal this modern library and information center. Extensive files contain books and technical material on chemistry, biology, agricultural chemistry and many other related subjects.

SHELL CHEMICAL CORPORATION

AGRICULTURAL CHEMICAL SALES DIVISION
460 Park Avenue, New York 22, New York



Fertilizers won't cake—flow freely in the field

Many a farmer has been cursed by the serious caking problem which so often occurs when deliquescent fertilizers are stored in damp or humid conditions. And many a formulator has learned that this can easily be prevented by using Celite*. These tiny particles of diatomite surround the fertilizer crystals or prills with

a protective coating that can prevent contact between them and thus minimize caking.

At the same time Celite fillers improve flowability. The particles are not only microscopic in size but extremely irregular in shape. Thus Celite coated fertilizers flow more freely. As little as 2% of Celite assures more uniform

application in the field.

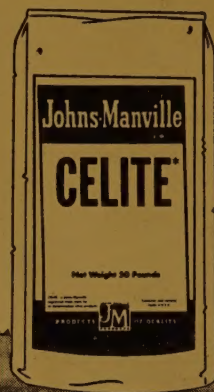
A Celite engineer will gladly help you put the right grade to work in your fertilizer. Just phone him at your nearest Johns-Manville sales office or write Johns-Manville, Box 14, New York 16, New York. In Canada, address 565 Lakeshore Road East, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

when formulated with

CELITE

diatomite fillers



Johns-Manville CELITE

INDUSTRY'S MOST VERSATILE
MINERAL FILLER

AGRICULTURAL CHEMICALS

Industry Meeting Calendar

May 14-18—2nd International Congress of Pest Control Operators, Vienna, Austria

May 19-21—Chemical Specialties Manufacturers Assn., 44th Mid-Year Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.

May 21-24 — 25th Meeting of the Western Chapter, National Shade Tree Conference, Disneyland Hotel, Anaheim, Calif.

May 22-23—Soil Science Society of North Carolina, North Carolina State College, Raleigh.

June 9-11—Association of Southern Feed and Fertilizer Control Officials, Heart of Atlanta Hotel, Atlanta, Ga.

June 15-18—National Plant Feed Institute, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 25-27—Pacific Branch, Entomological Society of America, San Diego, Calif.

July 8-10—Pacific Northwest Plant Food Association, Regional Fertilizer Conf., Pocatello, Idaho.

July 18-19 — Southwest Fertilizer Conference and Grade Hearing, Buccaneer Hotel, Galveston, Tex.

July 30 — Kentucky Fertilizer Conference, Greenville, Ky.

Oct. 14-15 — Western Agricultural Chemicals Association Annual Meeting, Villa Hotel, San Mateo, Calif.

Oct. 22-24—Pacific Northwest Plant Food Assn., Gearhart, Oregon.

Oct. 28-29—Northwest Garden Supply Trade Show sponsored by the Oregon Feed and Seed Dealers Assn., Portland, Oregon.

Oct. 29-31 — Fertilizer Industry Round Table, Park Sheraton Hotel, Washington, D. C.

Oct. 29-31 — National Agricultural Chemicals Association Bon Aire Hotel, Augusta, Ga.

Oct. 29-31 — Eighth annual meeting of the Entomological Society of Canada and the 95th annual meeting of the Entomological Society of Ontario, Guelph, Ontario.

Nov. 9-10 — California Fertilizer Assn. 35th Annual Convention, Ambassador Hotel, Los Angeles.

Nov. 20-21 — Annual Meeting, Oregon State Horticultural Society, Oregon State College campus, Corvallis, Oregon.

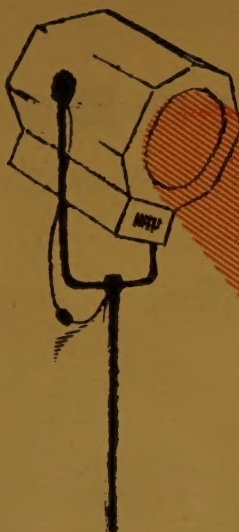
Nov. 24-25—Eastern Branch, Entomological Society of America, Lord Baltimore Hotel, Baltimore.

Dec. 1-4—Entomological Society of America, Sixth Annual Meeting, Hotel Utah, Salt Lake City, Utah.

Dec. 9-11—Chemical Specialties Manufacturers Assn., Sixth Annual Meeting, Commodore Hotel, New York.

Dec. 17-18 — Beltwide Cotton Production Conf., Rice Hotel, Houston, Texas.

Dec. 26-30—American Association for the Advancement of Science, 125th Annual Meeting, Washington, D. C.



*In the
Spotlight
this Month*

- **Nitrogen Losses . . .** Faulty equipment, operating techniques are factors to be checked in investigating nitrogen loss in ammoniation and granulation of fertilizers. Third part in a series discussing all phases of nitrogen losses and the ammoniation characteristics of superphosphates. Page 33.

- **Grain Infestations . . .** Insects are more susceptible to fumigants and fumigants are more active and efficient when temperatures are high. Best results therefore are obtained when the temperature is 75 degrees Fahrenheit or higher. Page 35.

- **Fertilizer Caking . . .** Evaluation of coating behavior can be useful in predicting efficiency of conditioning agents, where samples are subjected to warehouse storage tests. Page 39.

New Pesticides . . . Part two of a review of new pesticides. This issue reports on HCA, Dyrene, Thiodan, Eptam, DEF, and Phostex. Page 42.

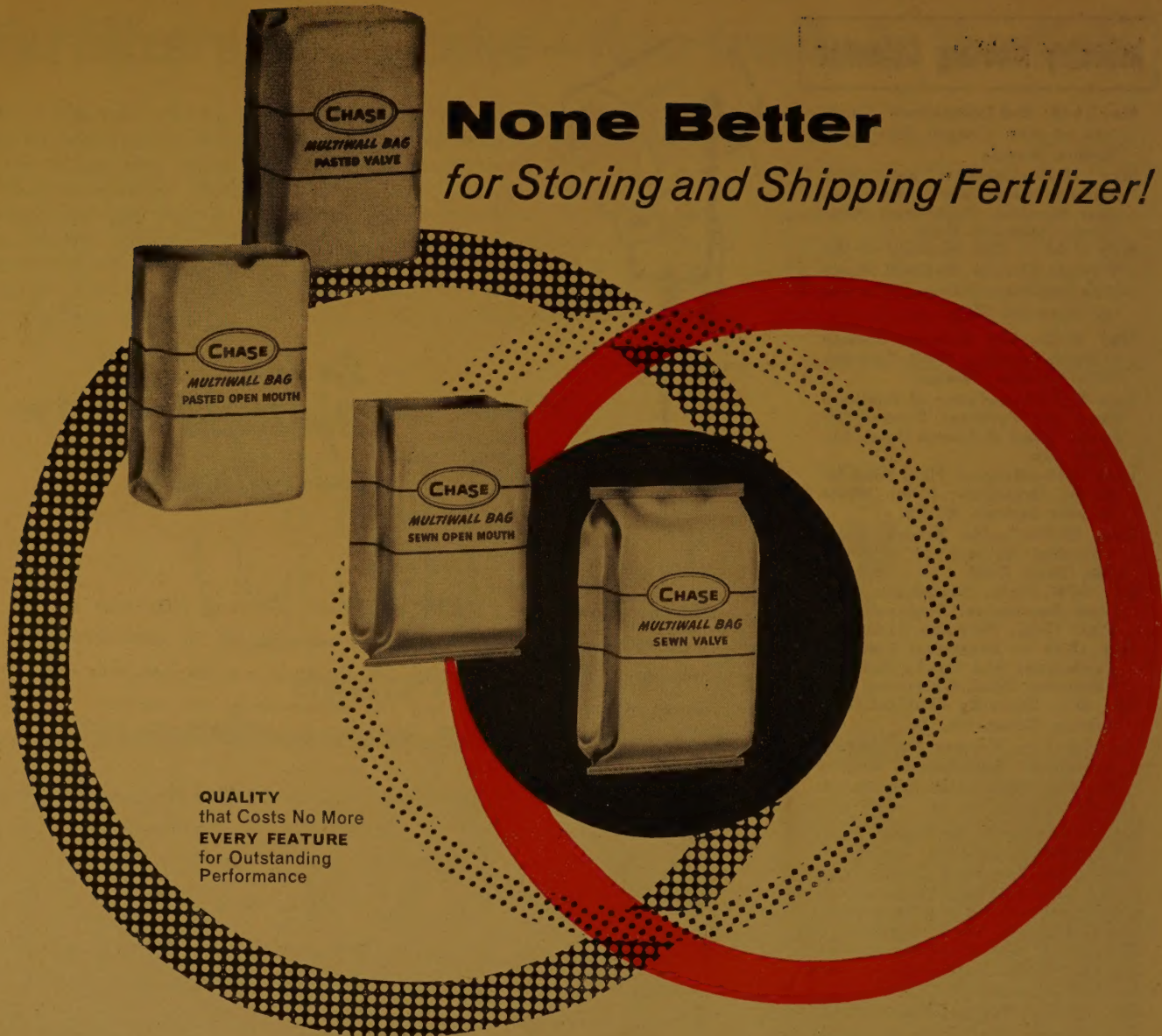
- **The Custom Applicator . . .** A new section directed to aerial and ground custom applicators. This issue reports on the Washington Association of Ground Applicators, answering such questions as:

1. Pests commonly controlled in the area.
2. Cost of neighborhood and group hiring.
3. Does the Applicator do his own mixing, etc.?
4. What spray materials are used?
5. What services does the Applicator offer?
6. Servicing farmers and home owners.

. . . Page 55

- **Aerial Application Equipment . . .** New planes described in this issue are the Grumman "Ag Cat" (on page 58) and a British plane for crop spraying (page 71). Both planes are designed especially for application of agricultural chemicals.

None Better for Storing and Shipping Fertilizer!



QUALITY
that Costs No More
EVERY FEATURE
for Outstanding
Performance

M/W MULTIWALL PAPER BAGS

by
**CHASE
BAG**

Look to Chase, too, for burlap bags, cotton bags, bags of all types. Make Chase your bag-packaging headquarters.

Multiwall Bags, like everything else, should be *right* for the job—right for *you*. Anything less wastes your time and dollars, means loss and inconvenience to customers.

That's why Chase supplies Multiwalls in such wide variety, in so many types and constructions . . . why the many Chase options—in papers, tapes, sewing—permit precise, money-saving selection.

Chase recommendations are backed by 110 years of bag-making progress . . . of service and satisfaction. It's wise to specify "Chase" for *dependable* Multiwalls—for uniformity, durability, attractive bag printing . . . reliable shipment.

CHASE BAG COMPANY

General Sales Offices: 155 E. 44th Street, New York 17, N. Y.

32 Coast-to-Coast Bag Plants and Sales Offices—a Nationwide Staff of Bag Specialists



“Who wouldn’t stick his neck out for feed grown in potash-enriched soil?”

TO ALL FERTILIZER MANUFACTURERS: Now the United States Potash Company offers three outstanding grades of potash. USP’s Higran and Higrade muriate, the purest agricultural muriates now on the market, are white potashes containing 62/63% K_2O . USP’s Granular muriate of potash (pink-red) contains 60% K_2O . All three grades are non-caking and free-flowing throughout.

Our Technical Service Department welcomes your inquiries.

UNITED STATES POTASH COMPANY

DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION

50 Rockefeller Plaza, New York 20, New York

Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia



REG. U.S. PAT. OFF.

MEMBER:
AMERICAN
POTASH
INSTITUTE

When you need

HIGH FINENESS INSECTICIDES



RAYMOND VERTICAL MILL



This is another Raymond-built pulverizing unit of special interest to producers of quality insecticides.

It operates efficiently in the upper fineness range of 90% to 95% passing 325 mesh or higher in the sub-sieve sizes to meet today's most exacting specifications.

It does an excellent job in handling concentrates of 50% or higher, delivering a uniform, thoroughly blended product.

PRINCIPAL ADVANTAGES

1. Most trouble-free operation
2. Complete and instant accessibility
3. Minimum down-time for cleanout
4. Easy and positive fineness control
5. Automatic dust-free operation
6. Low power and maintenance

Note the full length door opens wide to expose all of the interior parts for easy inspection.

Write for new Raymond Bulletin No. 78

COMBUSTION ENGINEERING, INC.
1314 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

Raymond Division

Combustion Engineering-Superheater Ltd., Montreal, Canada

SALES OFFICES IN
PRINCIPAL CITIES

THE MAN WITH THE MULTIWALL PLAN



**UNION
PACKAGING SPECIALIST
BOB BUCK**

**lowers
customer's
bag costs
\$35,000
annually**

A little weight reduction can go a long way in trimming Multiwall costs. Union Packaging Specialist Bob Buck demonstrated just how far during a study of one company's bagging operation.

The company had been using a baler bag of 160# total basis weight. Union's analysis proved that a 70/70 bag would be equally effective. The 20# reduction resulted in a savings of \$35,000 a year.

This economy came through Union's 5-Star

**Union Multiwall Recommendations
are based on this 5-Star
Packaging Efficiency Plan**



- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Packaging Efficiency Plan. Among the other improvements were: (1) A new, revised specifications manual which simplifies and streamlines inventory control. (2) Standardization of all bag printing. This assures delivery of completely uniform print copy from the firm's various suppliers.

Union's plan is producing thousands of dollars worth of savings for Multiwall users, large and small. It might point the way to a greater return on your packaging investment. Write for details.

**Better Multiwall performance
through better
planning**



UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

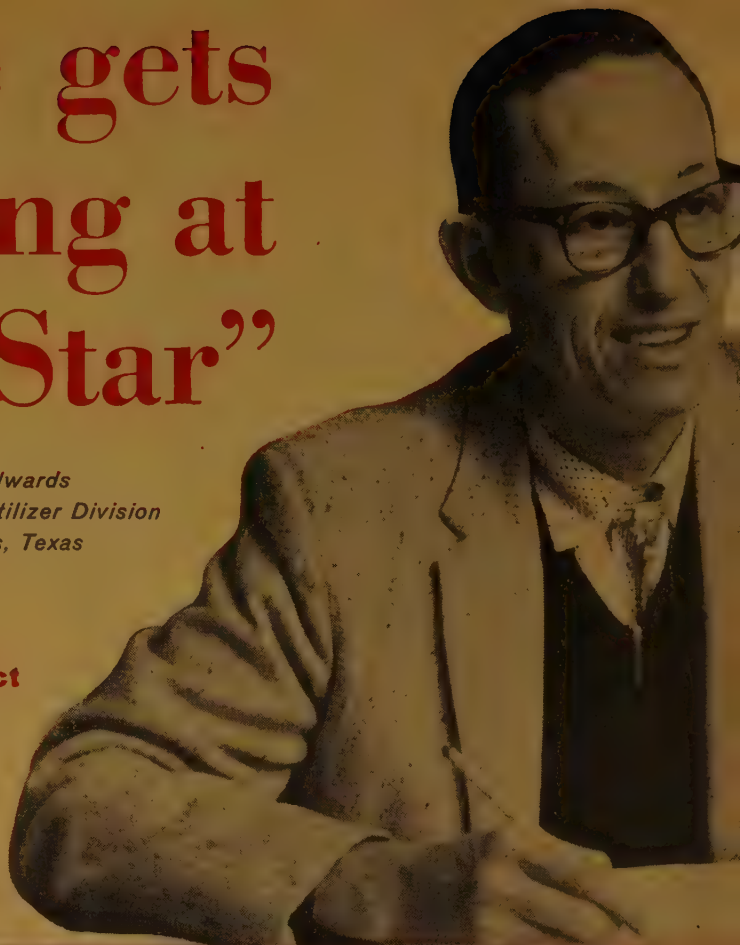
UNION MULTIWALL BAGS
UNION BAG - CAMP PAPER CORPORATION
233 BROADWAY, NEW YORK 7, N. Y.

"Service gets top billing at Red Star"

*says Archie Edwards
Manager, Red Star Fertilizer Division
Sulphur Springs, Texas*

"And service is a mighty big reason we contract International's Triple"

In supervising Red Star activities in Texas and four surrounding states, Manager Archie Edwards backs his decisions with more than 14 years of industry experience.



Setting up field demonstrations and helping dealers arrange meetings are common activities for Dale Campbell, field service director at Red Star. Complete merchandising service includes educational material on

fertilizer usage, films, printed brochures and hand-out material as well as soil and tissue testing equipment. Red Star's 5-state sales area keeps Campbell and "Super-Flo" truck busy year-round.

"An action-planned program of customer service put us on the road to success here at Red Star," says Archie Edwards, manager of Red Star Fertilizer Division.

Take for example, the flashy yellow "Super-Flo" service truck—a welcome and familiar sight to Red Star dealers.

The truck is loaded with educational, display and merchandising material... all designed to help dealers boost sales of "Super-Flo" fertilizers.

Red Star history dates to 1948, when the Sulphur Springs plant in northeastern Texas was purchased.

The plant operates as the fertilizer division of Southern Farm Supply Association.

The same idea of top-quality product backed by top-flight service is one of the reasons Red Star uses International's Triple Super. Prompt delivery keeps peak season production schedules humming... uniform high analysis and good physical condition eliminate troublesome formulation problems.

You can benefit from International's superior quality triple and service tailored to fit your needs. Contact your International sales representative now for additional information.



"Prettiest pelleted product anywhere," says Plant Superintendent John Souter, checking pellets at the cooler. Uniform, dust-free pellets are ideal for application by airplane.



Granulation foreman Collis Gowen checks reading on one of four belt gravimetric feeders that accurately weigh and control flow of all dry fertilizer materials.



Covered loading dock and expansion belts let Red Star workers load trailers direct from baggers—rain or shine. Belts are reversible to move goods into storage area.



All mixed goods are bagged under the "Super-Flo" label in both 50- and 80-lb. bags. In addition, the Red Star line includes other basic materials and specialty products.

INTERNATIONAL MINERALS



& CHEMICAL CORPORATION

PHOSPHATE CHEMICALS DIVISION

20 N. WACKER DRIVE, CHICAGO 6, ILL.

Trade Listing



MURIATE OF POTASH for the

PLANT FOOD INDUSTRY

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

* Trade Mark

Southwest Potash Corporation

61 BROADWAY • NEW YORK 6, N. Y.

National Agricultural Chemicals Association, Association Building, 1145 19th St., N.W., Washington, D. C. Lea Hitchner, executive secretary.

National Plant Food Institute, 1700 K St., N. W., Washington, D. C. Paul Truitt and Russell Coleman, executive vice-presidents.

Regional Offices listed on page 123.

Soil Science Society of America, 2702 Monroe St., Madison, Wisc. L. G. Monthey, executive secretary.

American Phytopathological Society, S. E. A. McCallan, secretary. Boyce Thompson Institute, Yonkers, N. Y.

American Chemical Society, 1155 16th St., N. W., Washington, D. C.

Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C., William Horwitz, secretary-treasurer.

Agricultural Ammonia Institute, Hotel Claridge, Room 305, Memphis, Tenn., Jack Criswell, executive vice president.

American Society of Agricultural Engineers, F. B. Lanham, secretary, 505 Pleasant St., St. Joseph, Mo.

Carolinas-Virginia Formulators Association, 516 S. Salisbury St., Raleigh, N. C. Hugh Horn, secretary-treasurer.

California Fertilizer Association, Sidney Bierly, executive secretary, Suite 1, Boothe Building, 475 Huntington Drive, San Marino, California.

Chemical Specialty Manufacturers' Association, 110 East 42nd St., New York City, Dr. H. W. Hamilton, secretary.

Entomological Society of America, 1530 P. Street N. W., Washington, D. C., R. H. Nelson, secretary.

Mid-West Soil Improvement Committee, 121 West Wacker Drive, Chicago 1, Ill. Z. H. Beers, executive-secretary.

National Nitrogen Solutions Association, 2217 Tribune Tower, Chicago, Ill. M. F. Collie, secretary.

National Cotton Council, PO Box 9905, Memphis, Tenn.

American Society of Agronomy, 2702 Monroe St., Madison Wisc. L. G. Monthey, executive secretary.

Weed Society of America, W. C. Shaw, secretary, Field Crops Research Branch, Beltsville, Md.

Western Agricultural Chemicals Association, Charles Barnard, executive secretary, 2466 Kenwood Ave., San Jose, Calif.

Let ANTARA help you with your pesticide products

We offer a dependable line of high-quality,
low-cost surfactants—

WETTING AGENTS SPREADERS

EMULSIFIERS SOLUBILIZERS

DISPERSING AGENTS

To help you in the formulation of herbicides,
insecticides and biocides.



Antara's experienced technical staff will be happy to consult with you on the best product for your needs. Just call us today.

Send for a free copy of "Antara Surfactants in Herbicides and Insecticides" which describes the use of these products in pesticide formulations.

From Research to Reality



ANTARA. CHEMICALS
A SALES DIVISION OF
GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET • NEW YORK 14, NEW YORK

Sales Offices: New York • Providence •
Philadelphia • Charlotte • Chattanooga •
Chicago • Portland, Ore. • San Francisco •
Los Angeles

In Canada: Chemical Developments of
Canada, Ltd., Montreal



The quality trio for effective pesticide formulation



Do you have our latest general agricultural chemical bulletin that contains specifications and extensive processing information? It's free. Write today. Just tear out this ad and attach it to your business letterhead and sign; we'll do the rest.

Floridin fuller's earth is widely recognized as the superior natural adsorbent that combines economy with outstanding sorptive efficiency. It is most widely used by formulators in three grades:

- ▽ Diluex "A," the finely ground, highly adsorptive degrittied fuller's earth.
- ▽ Diluex, produced from the same high quality mineral, but not as finely ground.
- ▽ Florex, in standard meshes for granular processing requirements.

In addition to inherent advantages of the basic products, rigid quality control is maintained constantly.

FLORIDIN COMPANY

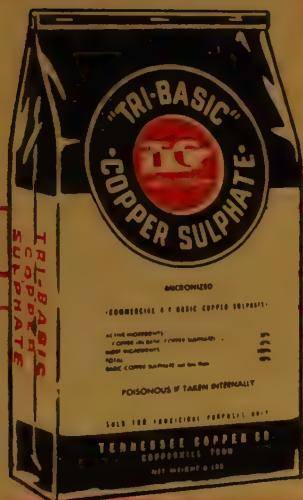
Adsorbents
Desiccants
Diluents



DEPT. M

P.O. BOX 989

TALLAHASSEE, FLORIDA



TRI-BASIC COPPER



The Versatile Fungicide

Longer Protection

Easy to Apply

Economical

Upgrades Quality of Fruits & Vegetables

Longer Shelf Life

Corrects Copper Deficiencies

Effective Control

Always Dependable

Compatible

Plentiful Supply

Is there another
Fungicide
offering these
advantages?

You get so many more advantages with Copper fungicides—used as a spray or dust on practically all truck crops in the control of persistent fungus diseases—Tri-Basic provides control of citrus and grape diseases, also on many deciduous fruits—Tri-Basic has excellent adherence qualities and protects longer—lower disease control cost—greater yield of top quality produce.

TRI-BASIC COPPER SULFATE

Quality Controlled from Mine to Finished Product

For further information
please make requests on
your company's letterhead.

TENNESSEE



CORPORATION

617-629 Grant Building, Atlanta, Ga.



Granulating is **fireproof** with Du Pont **URAMON**[®] Ammonia Liquors

Du Pont "Uramon" Ammonia Liquors give you maximum safety in high-temperature granulating by eliminating dangerous flash fires in the mixer; and, further, by assuring safety in the pile.

Fireproof conditions are maintained in the mixer when Du Pont UAL is used. As the ammoniation proceeds, the ammonium carbamate in UAL changes to ammonia and carbon dioxide. Ammonia enters the reaction and carbon dioxide displaces the air, thus creating conditions that guard against combustion.

Four formulations are available . . . all are equally safe for granulating. For technical assistance and information on the solution best suited to your use, write Du Pont.

HERE ARE OTHER IMPORTANT ADVANTAGES OF DU PONT URAMON[®] AMMONIA LIQUORS:

- High-quality nitrogen from UAL resists leaching . . . supplies both urea and ammonium forms of nitrogen.
- Won't corrode regular fertilizer manufacturing equipment, including ordinary steel and aluminum.
- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Suitable for either batch or continuous mixing.
- Prompt, dependable delivery enables you to schedule your production with confidence.



URAMON[®]
AMMONIA LIQUORS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

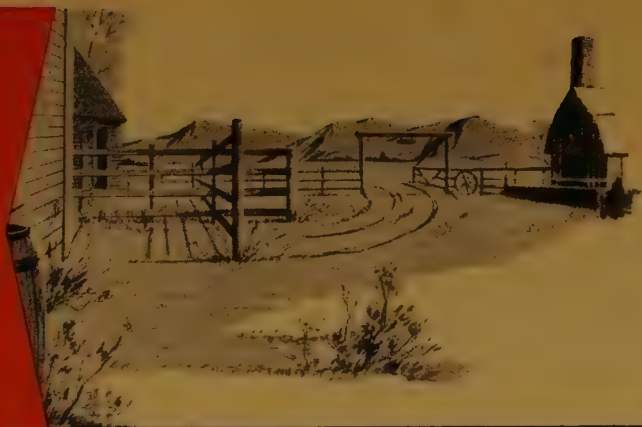
E. I. DU PONT DE NEMOURS & CO. (INC.)
Polychemicals Department • Wilmington 98, Delaware
1616 Walnut Street Philadelphia 3, Pa. 7250 N. Cicero Ave. Chicago 30, Ill.

Du Pont Company of Canada (1956) Limited
P. O. Box 660, Montreal, Quebec, Canada

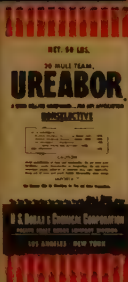
easy ways to

4

destroy weeds



1



UREABOR®

Nonselective. A granular complex of sodium borate and substituted urea... dust-free... for DRY application. Low rates of application are a big feature. The PCB Spreader applies the low rates to best advantage and is available for \$10.75 delivered anywhere in U.S.A.

2

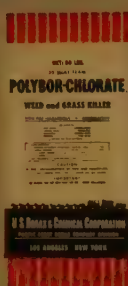


DB® Granular

A scientifically balanced formulation of 2,4-D and sodium borates... for DRY application. Kills deep-rooted noxious weeds—perennials and annuals—effectively and economically. The recommended low rates can be applied best with the special hand operated PCB Spreader.

(Not intended for control of grass)

3



POLYBOR-CHLORATE®

A highly soluble powder for spray or dry application. Its double action quickly destroys vegetation on contact and through root absorption. Provides long residual effects. This is a general nonselective herbicide for controlling all types of vegetation.

4



Concentrated BORASCU®

A granular concentrated sodium borate ore for nonselective control of weeds and grasses. It is easily applied, by hand or with mechanical spreaders, in its dry form. Long residual action is a feature—may prevent regrowth for a year or more.

Whether you are concerned with Agriculture or with Industry... you need **BORATE WEED KILLERS**

Weeds incur danger and great economic losses... they steal from crops... they constitute a fire hazard without equal. Nonselective BORATE weed killers attack this menace most effectively by destroying roots and rhizomes and preventing regrowth for long periods. During our lengthy experience with borates for weed control, we have developed special weed killers capable of destroying all types of weeds and grasses under the many various local and regional conditions.

YOU GET ALL THESE FEATURES:

- NONSELECTIVE HERBICIDAL ACTION
- RESULTS THAT ARE LONG-LASTING
- EASY APPLICATION AND CONVENIENCE
- EFFICIENCY AND ECONOMY
- SAFETY—Nonpoisonous, Non fire-hazardous
- WON'T CORRODE ferrous metals

AGRICULTURAL SALES DEPARTMENT

United States Borax & Chemical Corporation

PACIFIC COAST BORAX COMPANY DIVISION

630 SHATTO PLACE, LOS ANGELES 5, CALIF.



mail
this
coupon

UNITED STATES BORAX & CHEMICAL CORPORATION DEPT. AC
Pacific Coast Borax Co. Div., 630 Shatto Place, Los Angeles 5, Calif.

Please send literature on the following products:

- ☐ UREABOR® ☐ DB® Granular
☐ POLYBOR-CHLORATE® ☐ Concentrated BORASCU®

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____



Drilling blast holes with a multiple mounted drill
in the Duval mines near Carlsbad, New Mexico.
One of the many processes which bring you . .

High Grade Muriate of Potash...

HIGH ANALYSIS • DEPENDABLE SUPPLY • UNSURPASSED SERVICE

DUVAL SULPHUR
and
POTASH CO.

Exclusive Distributors

ASHCRAFT-WILKINSON CO.

ATLANTA, GEORGIA

Cable address: Ashcraft

Richmond, Va. • Charleston, S.C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio • Montgomery, Ala. • Des Moines, Iowa

LOOKING FOR A FINE GRIND WITHOUT INVOLVED MAINTENANCE PROBLEMS?

Then you're looking for a Bradley Pneumatic Hercules Mill. Because the Bradley Pneumatic Mill is installed on a foundation flush with the floor line, it not only reduces foundation costs but simplifies inspection and maintenance. Grinding parts are also easily accessible . . . both grinding die ring and roll assemblies can be removed without dismantling the mill. And the mill's durable, non-clogging vibratory feeder and electrical control eliminate manual feeding . . . allow continuous operation of the mill. Add rugged construction to this, and you have a mill which produces a uniform grind from 20 to 325 mesh with an absolute minimum of replacements and downtime.



BRADLEY PNEUMATIC
HERCULES MILLS

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63



BRADLEY PULVERIZER CO.

superior grinding equipment since 1891

LONDON ALLENTOWN, PA. BOSTON

HOW TO GET THE MOST FOR YOUR FERTILIZER MACHINERY DOLLAR

Before You Buy, Check Sturtevant's Answers to These Key Questions

Q - How much experience is built into the design ?

A - You get the benefit of 84 years of practical fertilizer industry experience in each Sturtevant machine you buy. Unrivalled for fertilizer plant engineering know-how, Sturtevant originated the 'Unit' idea. Whether your need is for a replacement pulverizer or mixer, or a completely modern granulating unit, Sturtevant-engineered machinery always can be depended upon to fit your requirements like a glove.

Q - Is the machinery engineered for peak-load efficiency ?

A - All details in each Sturtevant machine have been proved by years of peak-load performance in fertilizer plants. Rugged construction that withstands the most slam-bang use, gears designed to always perform dependably, bearings that stand up under the heaviest loads, all can be taken for granted in Sturtevant ma-

chinery. Many Sturtevant machines have been operating at top capacity and efficiency for well over a quarter of a century.

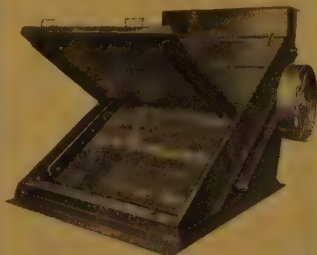
Q - How accessible is the machinery for clean-outs and repairs ?

A - Clean-outs are a constantly recurring problem in the operation of a fertilizer plant. And minor repairs on hard-to-get-at machinery can consume hours of costly man and production time. Sturtevant's practical "Open-Door" design guarantees quick accessibility — for clean-outs and repairs. Any parts requiring cleaning or maintenance are quickly exposed by "One Man in One Minute".

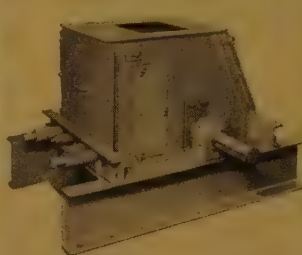
For rugged, reliable, efficient machinery you can depend upon for years — or for engineering assistance in planning or upgrading your fertilizer unit — it will pay you to consult Sturtevant. Write to STURTEVANT MILL COMPANY, 123 Clayton St., Boston 22, Mass.



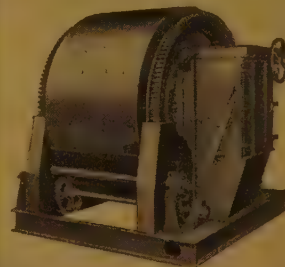
ELEVATOR



B-B SCREEN



ROTARY PULVERIZER



MIXER-AMMONIATOR



GRANULATOR

COMPLETE GRANULATION PLANTS
MIXING and SHIPPING UNITS
DEN and EXCAVATORS
CONVEYORS
FEEDERS and OTHER ACCESSORIES
MICRON GRINDERS
AIR SEPARATORS
CRUSHERS and GRINDERS

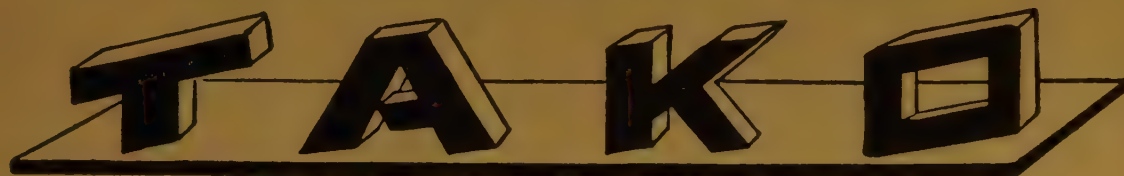
For further information, write Sturtevant today.

STURTEVANT MILL CO.

Dry Processing Equipment

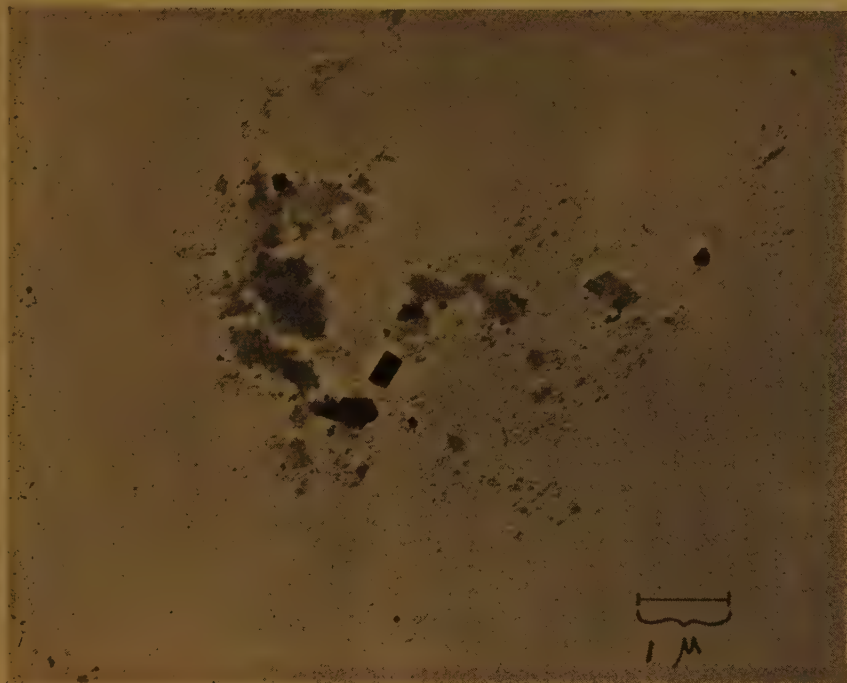
The "OPEN-DOOR" to lower operating costs over more years

THE NATURAL COLLOIDAL KAOLINITIC KAOLIN



QUALITY AND SERVICE SINCE 1939

TECHNICAL FACTUAL INFORMATION THROUGH RESEARCH



Electronphotomicrograph, TAKO

Magnification 4 (Negative, 5100 diameters; print, 15,000 diameters). On the print, 1mm corresponds to 0.067 microns. Distinct rectangular forms are observed in the range from 0.07 to 0.4 microns in length. Less definite evidence is seen for particles of still smaller size.

pH Value 4.4
Bulk Density—lbs. cu. ft.
Loose—Approx. 20 lbs.
Packed— " 41 "
Porosity 130%
Specific Surface—(CM²-22,700)
Particle Type—Crystal Flat
Rectangular Plates and
Crystal Aggregates
Specific Gravity—2.62
Particle Size Distribution—
Sedimentation, using
Andraesen Pipette Procedure

SIZE (Microns)	EQUAL or FINER %	GROUP %
.5		54.0
.5	54.0	
1.0	64.0	10.0
2.0	75.6	11.6
3.0	81.9	6.3
4.0	85.5	3.6
5.0	87.6	2.1
6.0	89.9	2.3
7.0	91.8	1.9
8.0	92.7	0.9
9.0	93.8	1.1
10.0	94.3	.5
10.0		5.7

**ABSOLUTELY
NO MICA**

**GUARANTEED LESS 1%
FREE MOISTURE**

"TAKO" Airfloated Colloidal Kaolinitic Kaolin is a natural practically chemically pure inert colloid with exceptional qualities. It excels as a diluent-carrier in formulations of insecticides-pesticides and as a prilling and coating agent in the production of high analysis fertilizers. It gives increased workability-dispersion. Its purity is highly desirable due to its compatibility with chemicals. Its colloids give increased adhesive—adsorptive properties.

"TAKO" used in large tonnage for years most successfully and economically as a diluent-carrier in the formulation of insecticides-pesticides and as a prilling and coating agent in the production of high analysis fertilizers.

"TAKO"—This Natural Very Pure Colloidal Kaolinitic Kaolin is produced from our Company-owned mines, processed under straight-line production with the very latest electric controlled automatic equipment—resulting in our very low per ton established price for this high quality colloidal product.

NON-ABRASIVE • NON-HYGROSCOPIC • NON-CAKING • FREE-FLOWING

"TAKO" Is Produced Under Laboratory Control — ALWAYS UNIFORM IN QUALITY

IT WILL PAY TO INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

THE THOMAS ALABAMA KAOLIN COMPANY

2412 KEN OAK ROAD, BALTIMORE 9, MARYLAND, U S A

MINES, PLANTS & SHIPPING POINT — HACKLEBURG, ALABAMA

USE TAKO WITH CONFIDENCE FOR BEST UNIFORM RESULTS

specify

VICTOR



METHYL PARATHION

Planters can count on bigger dividends when the formulation you sell them contains *Victor methyl parathion*... the ingredient that puts the *cide* in pesticide. It formulates into dusts, wettable powders and emulsifiable concentrates to make dead sure boll weevils, aphids, spider mites and other pests don't cut down the cotton crop.

Now in its 60th year, Victor is a leader in the production of organophosphorus chemicals. Methyl parathion is produced in its new plant at Mt. Pleasant, Tennessee—a central location that assures fast, dependable delivery.

For information, write to: Victor Chemical Works,
Dept. AC-3, 155 N. Wacker Drive, Chicago 6.



V
VICTOR
Dependable Name in
Chemicals
for 60 Years

YALE introduces...the INDUSTRIAL tractor shovel

DESIGNED TO GIVE YOU 25%



See it in action...let your operator drive it!

He'll like the roomy, uncluttered, comfortable cockpit. Adjustable seat gives him plenty of leg and foot room. Finger-tip controls conveniently located. Yale Torque Transmission with one speed forward and reverse—one directional control lever. He'll especially like Yale's exclusive Safety-Curve Arms. Gives him plenty of safe, elbow room—and extra visibility when bucket is raised. For a demonstration in your plant or for further information, write The Yale & Towne Manufacturing Co., Philadelphia 15, Pa., Dept. A-1065

MORE WORK EVERY HOUR

through these exclusive Yale features...

- Yale Torque Transmission (fully automatic)
- Accelerates to operating speed of 8 mph. in 3.5 seconds—to a speed of 13 mph. in 5.5 seconds
- 45° ground-level bucket tipback
- Safety-curve arms
- 6 foot dumping clearance
- Sealed brakes
- Front and rear operating lights

At last—a tractor shovel designed especially for industry! Whether you handle bulk chemicals, sand, gravel, scrap or raw materials, you'll get more productive work at less cost per work unit with this new concept in a tractor shovel.

Yale designed it for tight areas—built it *compact* (only 117" overall length) so that it can maneuver in any aisle wide enough for a wheelbarrow. *Accelerates to an operating speed* of 8 mph. in 3.5 seconds and to a top speed of 13 mph. in 5.5 seconds. Exclusive *Yale Torque Transmission (fully automatic)* permits quicker, smoother starting, eliminates shifting, provides more

power under load conditions—in a word, *speeds cycle operations*. This extra speed, plus the greatest carrying capacity of its class (full 2500 lbs.) means *up to 25% more work per hour*.

Yale's loader-linkage design offers unique advantages. Exclusive 45° *Ground-Level Tipback* insures the ultimate in loading action—and a grade-level carrying position to minimize spillage. Exclusive 6 foot *Dumping Clearance* is highest on any model of similar wheelbase. Bucket is *Automatically Self-Locating*. Operator merely lowers from full dump-position to ground-level—bucket automatically returns to digging position.

a product of Yale's integrated design—these engineering advances are standard features

- Gasoline; LP-Gas powered
- Sealed hydraulic system—keeps dirt out
- Pre-cleaner—air cleaner combination
- Extra strong heavy welded steel frame—greater safety, longer life
- Automatic bucket return to digging position
- Carrying capacity of 2500 lbs.—bigger load capacity
- Short wheel base—minimum turning radius
- Sealed generator and distributor
- Balanced weight distribution
- Maximum speeds up to 13 mph.



YALE*

*REG. U.S. PAT. OFF

YALE & TOWNE

INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

How well does **TREBO-PHOS**^{*} ammoniate?

**First commercial runs with Cyanamid's new
Triple Superphosphate indicate:**

1. Ammoniation easily achieved up to 4.6% and higher with suitable equipment.
2. Even at rates over 5%, no uncomfortable ammonia fumes were evolved under optimum conditions.
3. The ability of TREBO-PHOS to ammoniate at high rates means manufacturers may choose from a wide range of nitrogen carriers.
4. Early indications are that the physical condition of TREBO-PHOS makes possible *complete* and *uniform* absorption of ammonia. A well conditioned mixed fertilizer which is dry and drillable should be the result.

WRITE, WIRE OR PHONE FOR FULL INFORMATION. OUR REPRESENTATIVE WILL BE GLAD TO CALL. NO OBLIGATION ON YOUR PART.

^{*}TRADE MARK



American Cyanamid Company, Phosphates Department
30 Rockefeller Plaza, New York 20, New York

EDITORIALS



O PINIONS seem to be conflicting at this point in the season as to what sort of a year '58 will be for insecticide sales. A number of firms operating nationally are rather optimistic, and indicate that, depending on the development of weather conditions and insect infestations, there is every reason to believe that 1958 will be a rather good year from a volume standpoint. The recent price increases on some of the basic pesticidal raw materials are an indication that the year could be a much better one pricewise as well. Fortunately sale of pesticides has little relation to business activity, but varies rather with the weather.

Fruit sprays have been a bright early season spot in the picture for pesticide formulators. Conditions have been almost perfect for fruit growth, and formulators reportedly have already done a substantial volume of business in dormant sprays and bloom sprays. They have this business, at least, to tide them over until the mid-season dust business develops—and indications are that the latter will be tardy this year.

Reports from the southeast, where in a normal year the growing season should be well under way by this time, are extremely discouraging. The season is reported to be running a month to six weeks behind its usual pace. Planting of tobacco, cotton and corn are far behind schedule, and farmers are finding it impossible to get into many of their fields, because of the excessive rain. Fertilizer deliveries have been running substantially below normal and insecticide formulators have been forewarned that their own season will be late. Where in normal years the insecticide deal is often pretty well over by

July 4th, this year it seems certain it will still be going full steam to the middle of August.

With all the moisture, '58 could be a big bug year—if and when growers can ever get into their fields to plant a crop.

IS there or isn't there a shortage of ammonium sulphate as we move into the big fertilizer consuming season?

Several sources which are usually fairly accurate in their reporting of market developments say there is a definite spot shortage, in certain areas at least, resulting from the slow down in steel production. With the steel mills operating only at about two-thirds of capacity, output of by-product sulphate has dropped proportionately. Some producers have been hard put to satisfy all customer requirements.

Other suppliers, however, insist that there is nothing particularly unusual about the current situation, and one observer comments that he has never yet seen a March or April when every buyer of fertilizer raw materials could get all he wanted of each particular basic fertilizer ingredient, at a moment's notice and at his particular requested delivery point. It is impossible to visualize any real shortage of a material like ammonium sulphate, he observes, for potential productive capacity is upwards of two million tons, while domestic consumption does not normally run over about nine hundred thousand tons.

By-product ammonium sulphate can be produced at the rate of about one million tons annually when the steel mills are running full

(Continued on Page 109)

Nitrogen

Losses

in Ammoniation

Comments by
G. F. Sachselt†

RESEARCH of Rader and others has shown that ammonium nitrate and potash will react to form potassium nitrate and ammonium chloride. The handbooks tell us that ammonium chloride decomposes at 350° C (662°F). How does any part of the fertilizer run get that hot? Sulfuric acid may do this in two ways: (1) reaction with anhydrous ammonia, and (2) dilution with water. The second effect by itself would not heat the mix very far, but the ammonia reaction could produce high temperatures locally.

It almost seems as if we were in a bind here: if we don't hit excess anhydrous with sulfuric, it will flash off and we lose nitrogen; if we do hit it with sulfuric, we lose ammonium chloride; if we don't use that much anhydrous, the goods will cake like mud because of the high ammonium nitrate content.

A couple of months ago, a Uramon solution might have looked like part of the answer. The data of Lehr and others presented at the last ACS meeting suggested that urea can cause as much caking as ammonium nitrate. Throwing the potash in last would be a possibility, but it requires revamping the process or equipment. It may also create new problems, such as lack of uniformity in the goods,

This third part in a series of articles on factors affecting nitrogen losses in the production of granulated fertilizers, and on the factors influencing ammoniation of superphosphates includes comments by G. F. Sachselt, Battelle Memorial Institute, Columbus, Ohio; Elmer C. Perrine, Nitrogen Division, Allied Chemical and Dye Corp., and T. P. Hignett, TVA. The observations reported here were originally presented at the Fertilizer Industry Round Table, Washington, D. C., November, 1957.

particularly if granulation is practiced. Good liquid distribution and solids mixing should prevent much of this local overheating. A longer ammoniator may help in this way.

"PROVEN SCRUBBER SYSTEMS"

"What this country needs is a Socony-Mobil Economy Run for scrubbers." This is a sort of flippant way of saying that it is difficult to set up performance standards for scrubbers that will allow a clear-cut choice for each problem. Ideally, everybody wants low investment, low operating cost, and the best possible performance, including often the recovery of the effluent in usable form. Such recovery is accomplished only occasionally with scrubbers. Some of the general characteristics of scrubbers and a chart showing some fume particle-sizes and the performance range of scrubbers and other gas cleaning equipment are shown in the attached excerpts from the *Handbook on Air Pollution* by McCabe and others.

Battelle's* experience with fertilizer fume problems has shown that the Pease-Anthony Venturi and, with some modification, the P-A Cyclonic scrubber, will do a good job on rock acidulation fumes. Ordinary spray-

towers and impingement scrubbers seem to be less effective. J. E. Reynolds** reported about a year ago that high pressure water sprays in a home-made scrubber did a good job of removing ammonium chloride fumes from an air stream. Generally speaking, it is cheaper to put a lot of energy into the water, than to put it into the air stream, i.e., high water pressure and low gas pressure drop lead to best economy. If water won't wet the fume particles, another fluid, such as oil, may do a better job than water with wetting agents.

A relatively new scrubber has recently been claimed to be quite effective although I do not know of any application in the fertilizer industry. It operates with a downward flow of air into a foam chamber and uses a screen in the air stream, probably to generate turbulence. If the foam collapses, a significant pressure drop would result. There is also some question how large the foam chamber must be to provide for effective gas-liquid contact, since the bubbles in the foam tend to be large compared with the droplets of a high-pressure water spray.

*Battelle Memorial Institute, Columbus, Ohio.

**J. E. Reynolds, Davison Chemical Co., Baltimore, Md.

†The trade marked scrubbers mentioned here are to be taken only as examples of this type of equipment. There are other makes of scrubbers operating on the same principle. Time and space made it impossible to furnish a comprehensive listing of all the manufacturers making the various basic types of scrubbers.
—G. F. Sachselt.

EXCERPTS FROM *Handbook on Air Pollution* (McCABE, ET AL.)

Scrubbers, washers, and their various modifications are widely used in industry for cleaning and cooling air and other gases. Water is naturally the liquid used most often; caustic may be added for acid mist collection. Wetting agents decrease bubble size, accentuate frothing, increase entrainment, and usually add little to collection efficiency. Oils may be employed for removing substances not readily wetted by water.

SPRAY CHAMBERS

The simplest type of gas scrubber is an empty tower into which liquid is introduced at the top through a bank of spray nozzles, while the gases pass countercurrent to the falling drops. Spray towers are employed as coolers and as primary cleaners in treating blast-furnace gas and for fly-ash and cinder removal. They are satisfactory for removing coarse dust if high efficiencies are not required.

The Pease-Anthony cyclone spray scrubber (Chemical Construction Corp.) is a modification of the simple spray scrubber. The scrubbing liquid is introduced through nozzles located on a central manifold, and the gases enter through a tangential duct either at the top or bottom of the cylindrical tower.

Initial costs for mild steel con-

struction range from about \$1.50 per cfm for 500-cfm units to \$.40 per cfm for units larger than 25,000 cfm; corresponding figures for stainless steel are \$2.25 to \$.80 per cfm.

The Pease-Anthony venturi scrubber (Chemical Construction Corp.) is an atomizing device designed to extend the use of gas scrubbers to removing submicron particles. The scrubbing liquid is introduced at low pressure at the throat of the venturi through which the gas is passed at velocities ranging from 200 to 500 fps.

Initial costs for mild steel con-

struction range from about \$2.00 per cfm for 500-cfm units to \$.50 per cfm for units larger than 25,000 cfm; corresponding figures for stainless steel are \$3.00 to \$1.00 per cfm.

DEFLECTOR WASHERS

Several types of commercial washers utilize deflector plates to capture and also to help disperse spray droplets. In general, these collectors are designed for removing particles larger than 1 to 5 μ .

Initial costs for the Type N Rotocloner vary from about \$0.32 to \$0.24 per cfm in the 5,000- to 40,000-cfm range.

Why is so much trouble experienced with the nitrogen content of high analysis 1-1-1 ratio fertilizers (12-12-12, 14-14-14 etc)?

Elmer C. Perrine

The loss of nitrogen that is most frequently encountered and which accounts for much loss in the industry is failure to combine the free ammonia with the superphosphates, and to some extent with the added acids in the formulas.

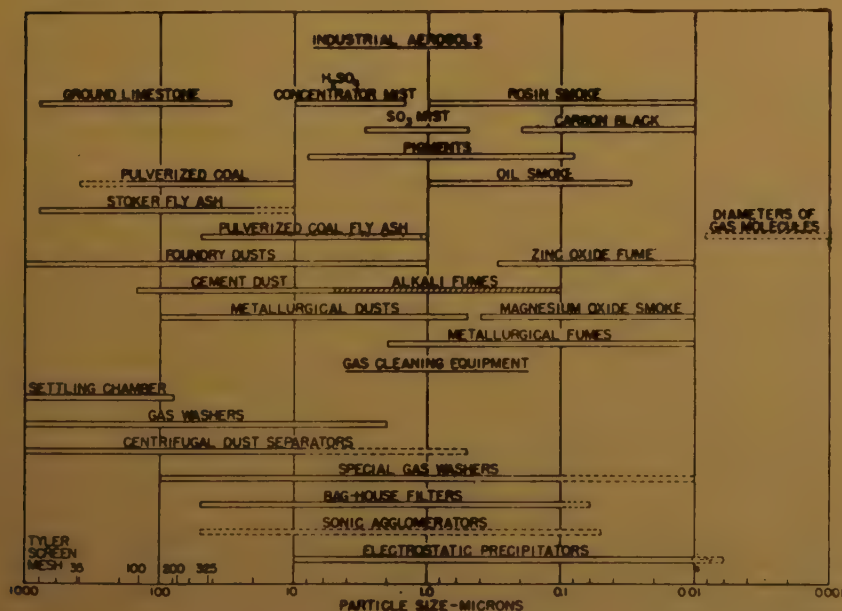
Largely through faulty equipment or operating techniques the unintended actions of some chemicals in formulas result in some nitrogen loss. High heats of drying in some granulation plants are possibly causing losses.

Screening of fines from granulated grades can influence analysis if they are not returned to process.

Improper handling of ammoniating solutions can reduce their nitrogen content. One of these actions is the excessive venting of storage and measuring tanks during transfer of volatile solutions. Another would be the use of a solution that had partially salted out in storage or in tank cars. The influence of these two factors is not very great in the average plant, but has been considerable in a few cases.

It is true that many plants are retaining essentially 100% of the ammonia input at rates of 6.5 pounds per unit of 20% superphosphate and 3.5 pounds for triple superphosphate. This requires equipment that is designed for the job, and also requires considerable skill in operation. Some plants are operated as though the desire for the benefits of high rates of ammoniation is all that is required and they merely pour the nitrogen solution into the mixer without any recognition of the needs of equipment or techniques.

Beyond three pounds of ammonia per unit of 20% superphosphate, considerable ammonia is usually lost to the atmosphere unless equipment and techniques are suitable for the requirements that are quite specific for high rates of ammoniation. Even with the best of equipment it seems impractical to hold more than 8 pounds of ammonia per unit of 20% super-



Particle size of industrial aerosols and equipment for cleaning gases.

phosphate, and this requires an input of 9.0 pounds, involving a calculated loss. Inputs as high as 12 pounds have generally failed to increase the retention much beyond 8.0 pounds. Much nitrogen is lost through this technique and not all operators are fully aware of the reasons.

Deterioration of equipment and the creeping tendencies of plant operation account for much loss of nitrogen.

Where formulation demands the maximum ammonia take-up from the superphosphates, unless both the acid and ammoniating solutions are added in such a manner that each pound of ammonia has its chance to react with its allotted 3 pounds of sulfuric acid the conditions are present for loss of nitrogen from two sources. One loss caused by improper use of acids is from the unreacted ammonia that escapes to the atmosphere. The second loss may be through ammonium chloride escaping to the atmosphere.

Agglomeration, before all of the ammoniating solutions have been added, reduces or completely stops further ammonia take-up about as though the particle size of the superphosphate had been suddenly increased. Changing to another solution has corrected this condition, which may help to explain the reason for the number of nitrogen solutions being used for granulation. There have also been cases of unwanted granulation in pulverized fertilizer manufacturing which caused problems in ammonia take up.

Good operations in most granulating plants hold the products in the dryer to no more than 250 to 275° F and these are reached for a very short time in the dryer. As indicated in other discussions at this meeting, such temperatures are acceptable operations. Some of the nitrogen salts are possibly broken down in dryers that may be operating at unduly high temperatures. These excessive heats are often resorted to in order to offset some other factor which might better be corrected directly. In one case, a sample of about 25 pounds taken from the dryer exit had an average temperature of 350°F. Some particles had possibly reached temperatures

high enough to subject some of the ingredients to change. Excessive temperatures usually bring penalties of poor granulation and reduced tonnage per hour until the conditions that in-

vite excessive temperature are corrected. Air pollution is often a result of excessive heat and other attempts to force a granulation plant beyond some of its limitations.

Use of Inhibitors to Reduce or Stop Nitrogen Losses in 1-1-1 Ratio Fertilizers

T. P. Hignett

THE present discussion will be related to losses that may occur in the storage pile in the case of high-nitrate - high-chloride mixed fertilizers. Incidentally, we do not believe that losses occurring in the storage pile are at all common.

Fertilizers of high nitrate and chloride content made by usual formulations will decompose, losing nitrogen at high temperatures. The decomposition starts at 380°F. The heat of reaction then causes the temperature to rise further to perhaps 700°F.

For instance, in one test made by TVA, one end of a bag of 14-14-14 was heated with a blowtorch until fumes appeared. The flame was then removed. The material continued to smolder, giving off brown fumes as the reaction slowly ate its way through the bag of material. After about 4 hours the reaction had eaten its way through the entire bag. The residue remaining had lost 99 per cent of its nitrogen and 20 per cent of its chlorine.

The reaction could not be stopped by drenching the bag with water. It could only be stopped by raking the material out of the bag and drenching all of it with water.

Similar materials of high nitrate content that did not contain chlorine were tested. When heated with a blowtorch, fumes appeared, but when the blowtorch was removed, the reaction ceased.

Dry nongranular mixtures of ammonium nitrate and potassium chloride, with or without superphosphate, were subject to self-propagating decomposition when heated. As little as 3 percent chlorine was sufficient to sensitize the reaction. Potassium sulfate did not sensitize the reaction.

Either monoammonium or diammonium phosphate inhibited the reaction. Mixtures that had high nitrate and chlorine contents were not sensitive when they contained enough ammonium phosphate to equal 60 per cent of the weight of their ammonium nitrate content. There is some evidence that ammonium sulfate inhibits the reaction, but no quantitative data are available. No other inhibitors have been identified insofar as we know, although not much work has been done along this line.

Acidic mixtures containing organic matter and nitrates are subject to spontaneous heating and consequent nitrogen loss, according to USDA studies (*Ind. Eng. Chem.* 38, 1298-1303, 1946).

To summarize, fertilizers of high nitrate and chlorine contents are sensitive to self-propagating decomposition when heated to about 380°F. Even a small lump of material reaching the pile at this temperature may cause the reaction to spread throughout the pile. Heating by external means of a small portion of the pile will start the reaction; this heating may be caused by contact with steam pipes, welding operations, dynamiting, or other accidental causes. Mixtures that do not contain chlorine are not sensitive. Ammonium phosphates inhibit the reaction if present in sufficient quantity. Thorough cooling before pile storage and guarding against accidental heating may be the best means of preventing the reaction.★★

John Hardesty, USDA, suggests the following additional references on nitrogen losses in fertilizer production

Davis, R. O. E. and Hardesty, J. O. Organic Material and Ammonium Nitrate in Fertilizer Mixtures. *Ind. Eng. Chem.* 37, 59-63 (1945)

Hardesty, J. O. and Davis, R. O. E. Spontaneous Development of Heat in Mixed Fertilizers. *Ind. Eng. Chem.* 38, 1298-1303 (1946)

Kumagai, Rikio, Rapp, H. F. and Hardesty, J. O. Physical Factors Influencing Ammonia Absorption by Superphosphate. *Agr. Food Chem.* 2, 25-30 (1954)

Grain Infestation

A review of a report on standard methods of preventing and controlling insect infestations in flour mills. At right, — examining the grain bins for insect infestations.

THE Biological Sciences Branch, Agricultural Marketing Service, USDA, recently released a handbook prepared by R. T. Cotton that provides information on standard methods of preventing and controlling insect infestations in flour mills. Co-operative studies, conducted during the past few years by industry and the Food and Drug Administration, have shown that a major source of contamination in flour can be traced to the wheat that becomes infested while in storage, transportation, and milling. Flour of acceptable quality is obtainable only from grain that is free from serious contamination by insects and rodents.

The insects that feed within the wheat kernels are of most concern to the miller. Insects that feed externally may destroy grain or cause it to heat, of course, but they are easily removed by the cleaning process prior to milling.

Studies show that slightly over half of the wheat shipments reaching the mills over a one-year period have some degree of internal insect infestation. Infestations tend to be lower in the West, Northwest, Inter-Mountain, and Northern states—or in areas where the wheat is predominantly hard red spring or white wheat—than in the Central Plains states where hard red winter wheat is predominant. They are highest in the soft red winter

wheat from the mid-Western and Eastern states.

Insect infestations in wheat increase as wheat moves from the farm to the terminal elevators. In market wheat infestations are low from May to September during the marketing of the new crop. The level begins to increase in September and continues to do so through the winter.

In general it has been found that wheat with more than 0.5 per cent of infested kernels is unfit for milling. For domestic flour production some mills will not use wheats for their mill mixes that contain more than eight internal insects per 100 grams. In wheat containing appreciable insect infestation there are usually enough kernels showing emergence holes or insect damage so that an experienced grain man can determine the degree of infestation by looking at a sample. The most accurate and widely used method of determining the extent of internal insect infestation in samples of grain, however, is by the use of X-rays. X-ray machines are used to take radiographs of 100-gram samples of wheat that reveal insect forms within the kernels. Manufacturers have now developed X-ray units specifically for this purpose and, although equipment and continuous operation are rather expensive, the method is being used extensively by large milling concerns.

Flotation methods also are used. Recent studies indicate that a mixture of sodium silicate in water with a specific gravity of 1.160 and methyl chloroform adjusted to a specific gravity of 1.30 with refined kerosene will result in a definite separation layer between the two liquids. Kernels containing late stages of weevil larvae float on top of the sodium silicate solution; kernels containing early stages of weevil larvae and some non-infested lightweight kernels are buoyed up to the separation level of the two liquids; while non-infested, normal-weight kernels sink to the bottom.

Double floors or walls in flour mills provide harborage for insects; making them difficult to eliminate. Other danger spots are elevator boots; conveyors for flour, grain or dust; conveyors on reels and purifiers; dead spouts and conveyors; dust-collecting systems in general; and the bottom and idle sections of certain types of sifters. A certain amount of grain remains undisturbed in milling units.

Redesigning milling equipment or replacing it with more modern machinery helps eliminate insect breeding places, and a pneumatic conveying system for mill stock solves many of the problems of keeping a mill clean and sanitary. Pneumatic lifts require far less space than elevator legs and can be located alongside the walls. The space formerly taken up by ele-



vator legs can be used for additional machinery.

Syngerized pyrethrum or allethrin are effective as contact sprays against mill insects and can be used inside and outside milling machinery with safety. When stock is removed from milling units by vacuum cleaning, many millers follow up with pyrethrum spray. Other insecticides used as residual sprays on walls and floors should be limited to those approved for use on or around grain.

At times, however, all mills become so infested that simple sanitary measures are insufficient, and more effective treatments, such as fumigation, are necessary.

The success of fumigation of flour mills and warehouses is dependent on the care and skill with which it is accomplished. Because fumigants used in this work are highly toxic to humans and dangerous to handle, it is best to have general mill fumigation done by professional fumigators.

The proper preparation of the building, the choice of the fumigant, its proper application, and favorable weather conditions are important to the success of fumigation of any building. Insects are more susceptible to fumigants and fumigants are more active and efficient when temperatures are high. Best results, therefore, are obtained when the temperature is 75 degrees, fahrenheit, or higher. Heavy wind will cause the fumigant to drift to one side of a building, leaving an inadequate concentration on the other side.

In practice it is important to obtain the maximum concentration of a fumigant in a building at the earliest possible moment because, if the concentration builds up slowly, the natural leakage may be great enough to prevent an effective concentration from ever being attained.

Hydrocyanic acid has been used extensively as a fumigant for flour mills for many years. It is particularly well adapted for this type of work because many mills are not built to hold a gaseous fumigant for any extended period and only a gas that acts quickly can be effective. Hydrocyanic acid gas kills with great rapidity; therefore, notwithstanding the fact

that all the gas may be lost in a short time, a nearly perfect kill may still be obtained.

Several methods of fumigating with hydrocyanic acid have been developed, all of which have their application. Of the various methods of generating the gas, that of vaporizing liquid hydrocyanic acid is used most extensively.

The method by which liquid hydrocyanic acid is most commonly used in the United States consists in forcing it into the open space of a flour mill through a system of metal piping equipped with spray nozzles. The cylinders containing the gas are attached to a manifold on the outside of the building and the fumigant is forced into the piping system by means of compressed air. In mills fumigated by the liquid method a permanent system of piping often is installed.

For the fumigation of modern, tight, concrete, stone, or brick mills, methyl bromide has been found highly efficient. Methyl bromide is relatively inexpensive at the dosages required for fumigation; highly toxic to all stages of insects, including their eggs; non-inflammable at concentrations used in commercial practice; and it can be used successfully at comparatively low temperatures. It has remarkable powers of penetration and is the most efficient fumigant known for the treatment of warehouses filled with bagged commodities.

Methyl bromide can be applied through a piping system or it can be released directly into the open space from cylinders placed at strategic points in the mill. Under ordinary conditions, a mill that has been fumigated with methyl bromide will air out rapidly after it is opened up.

Chloropicrin has been used for many years for the fumigation of flour mills. It is available in two forms, with or without a propellant. The propellant form is available in 50-pound containers of a 30-70 mixture of methyl chloride and chloropicrin. When the valve is opened the methyl chloride propels the chloropicrin from the applicator in a fine mist that vaporizes rapidly.

When chloropicrin is used without a propellant, it is sprinkled on

empty sacks spread on the floor or is poured on a pile of empty sacks. After an exposure of 24 hours, the mill must be thoroughly aerated before milling operations can be resumed.

The treatment of an individual machine in a mill with a fumigant is referred to as a local fumigation. After a general fumigation to eliminate the insect population of a mill, it is only a matter of time before some of the milling units will become re-infested from individual insects surviving the fumigation, or through one or more of the avenues by which insects enter the mill. The proper use of local fumigants keeps infestations at a point where they cannot become a serious factor.

Among other methods for controlling insect infestations are exposure of the mills to extreme heat or cold and continuous-process sterilization by heat of milled cereal products too coarse to permit sieving for the removal of any insect life.

To prevent the development of insect infestation in stocks awaiting shipment in warehouses, continuing precautions are necessary. They include fumigation of empty warehouses; frequent cleaning of conveyors, elevators, and other parts of the system; a centrifugal machine to give the flour just ahead of the handling equipment a precautionary treatment; and insect-resistant bags.

The use of radiant energy for the treatment of grain and cereal products has received considerable attention during the past few years. Many workers have demonstrated that insects can be killed with radiant energy; however, at present the high cost of equipment, upkeep and operation, together with limitations in capacity, make it doubtful whether radiant energy can compete with other methods of insect control now in use. Continued research may result in the development of a practical method of using some form of radiant energy for treating grain and cereal products.

Dr. Cotton's handbook is available from the U. S. Government Printing Office in Washington, D. C. It is titled, "Insect Control in Flour Mills" and is Agriculture Handbook No. 133.★★



South Florida Pest-O-Rama

MANUFACTURERS, distributors, dealers and the general public were among the hundreds of persons attending the third annual South Florida Pest-O-Rama held at Miami on March 30th. The Pest-O-Rama, formerly known as the Pest Control Field Day, was presented by the Florida Agricultural Extension Service in cooperation with the Florida Nurserymen & Growers Association, the South Florida Garden Supply Association, the Horticultural Spraymen's Association, the Greater Miami Landscape Nurserymen's Association, the Horticultural Study Society, and the Dade County Vocational Agricultural Department. Most of the foregoing associations attended the Pest-O-Rama instead of holding their regular meetings.

The all-day program, planned by assistant county agent Douglas Knapp, featured prominent speakers from the Florida Agricultural Extension Service at Gainesville, the Florida State Plant Board, and representatives of chemical manufacturing companies.

Farm chemical representatives at the South Florida Pest-O-Rama: John Frederick, Florida East Coast Fertilizer Co.; William Zimmerman, Velsicol Chemical Co.; Lewis Logsdon, Gro Chemical Co.; and Clayton White, Re-Mark Chemical Co.

The first speaker on the program was Bogardus Werth, representative of the Virginia-Carolina Chemical Corporation. Mr. Werth covered the subject of nematocides made by his company. He gave instructions for the use of V-C 13 when establishing plant beds, transplanting potted plants, treating ornamental plants, lawns, crops, and trees. Mr. Werth said that V-C 13 can be used as a drench without damage to established plants such as grass, shrubs, and trees. For food crops he recommended soil treating two weeks prior to planting them.

The Shell Chemical film "Rival Worlds" was shown, and W. E. Feistner, a representative from that company, also spoke on nematode control.

Mr. Feistner described their Nemagon fumigant which he recommended for application on all major ornamental plants, fruit trees, and most crops except potatoes, onions, tobacco and chrysanthemums. He also described another Shell soil fumigant

(DD-Mixture) containing a mixture of dichloropropene dichloropropane for use as a pre-planting treatment. Mr. Feistner stressed the importance of placing fumigants at the right depth (six to eight inches) and of securing a good covering seal. He predicted that in the early future the application of fumigants will be made in combination with fertilizer in order to save time and equipment. He also said that his firm is coming out with a new type of bare root dip for the treatment of nematodes.

Mr. Feistner illustrated nematode activity with a large scale model showing how the nematodes attack plant roots and digest their cells.

Discussing some commonly available nematocides, Donald M. Coe, extension plant pathologist at the Florida Agricultural Extension Service, reviewed use of some 14 commercial products, mentioning the formulations available, and how the materials should be used. Products discussed were: Dordone, Dowfume W-85 and Garden Dowfume (offered by Dow

D. LaFerriere, King Spray Service; R. Kuster, Florida Spray Co.; Charles P. Johnson, Charlie P. Johnson Nursery & Spray Service; T. Kaplan, King Spray Service; and assistant county agent Douglas Knapp.



Chemical Co.); Nemagon, and D-D (offered by Shell Chemical Corp.); Garden Nu Fume (an ethylene dibromide formulation offered by Collins Chemical Co.); Soilfume 85 (Niagara Chemical Co.); VC-13 (Virginia-Carolina Chemical Co.); Vapam (Stauffer Chemical Co.); Mylone 85-W (Florida Agricultural Supply Co.); X-Cel Gardenfume and Soil Fumigant (ethylene dibromide formulation by Jackson Grain Co.); and Soilfume 80-20 (a 20% ethylene dibromide formulation offered by the Kilgore Seed Co.).

Extension entomologist J. Brogdon reviewed the use of various insecticides and miticides. Mr. Brogdon distributed a 25-page dictionary listing hundreds of these products according to trade name and ingredients, which included brief descriptions regarding use, toxicity, and methods of application of the products. He emphasized that the list, prepared by the Florida Extension Service, was not intended to be a recommendation of any of the products, but merely a description and reference chart which he felt would be helpful in regard to application of the right material at the right time in the right amount and in the right way. He also spoke briefly on different types of spray equipment and urged that proper attention be given to insure good coverage when spraying.

Dr. S. H. Kerr, entomologist from the Agricultural Experiment Station, spoke on the use of insecticides in controlling lawn pests. Dr. Kerr said that the development of new types of lawn grasses has brought additional attention to some pests which are not new but have recently become more noticeable because of the susceptibility of the new grasses.

At the evening session, Harold Denmark, acting chief entomologist, Florida State Plant Board, told about the imported fire ant and its threat to Florida.

In addition to the lectures, there were exhibits by chemical companies and demonstrations of equipment. Some of the chemical firms exhibiting were: Geigy Chemical Co., Velsicol Chemical Co., O. E. Linck Co., ReMark, Gro Chemical Co., O. M.

Scott & Sons, and California Spray-Chemical Corp. Spray equipment was shown by Charlie P. Johnson Nursery

& Spray Service, Bishop Seed Co., Miami Lawns Inc., and Hector Supply Company.

Advice for the Pesticide Industry from an Organic Gardener

I have been a reader of *Agricultural Chemicals* for a number of years and have found it to be a good source of information about the industry. I read your editorial page carefully each month and have been interested to note lately how often organic gardeners have been blamed for various unfavorable situations that the chemical industry finds itself in.

I suppose that if I were in your position I would accuse organic gardeners also and I would be thinking about conducting a public relations program to improve public acceptance of the chemical industry, as you say the chemical industry is now planning. However, being on the other side of the fence as I am, I have a rather different perspective on the problem than you have and perhaps I can be of a little bit of help to you.

Organic gardeners are not out to put the chemical industry out of business. Our principal goal is to help the average American get a fair shake as far as a pure food supply and environment is concerned — something that we feel he is not now getting.

It is my feeling that the chemical industry is itself causing many of the problems that are besetting it by not recognizing the fundamental rights and desires of the general public. People in the chemical industry are so confined by their academic and commercial ivory towers that they no longer feel the true pulse of the people. Americans are independent people, and can be very troublesome when they feel that they are being unfairly used. The 1957 Gypsy Moth spraying revealed this trait because it was the first time that the highly populated northeastern area of the U. S. had dramatized to its populace the extent to which the chemical industry is today influencing our environment. As you said in your editorial, many people would have objected even if they had been sprayed with perfume. In that statement you hit at the heart of the problem, but failed to see its implications. I am sure that hundreds of people would have felt that their rights were being infringed even if they were sprayed with pure water. Americans are like that, and because the chemical industry has failed to realize it, it is getting deeper and deeper into trouble.

For years, the chemical industry has been accustomed to ignoring public reactions primarily because the public didn't have the slightest idea of what the chemical industry was doing. As long as new products were approved by the government and academic researchers, the chemical industry felt completely justified in using these new products. Now, however, the public is beginning to be interested in what chemicals are being used in the production of its food supply and the more they find out, the more resentful they are of the

chemical industry. One unfavorable opinion by a member of the public about a chemical product offsets twenty favorable impressions on other products that he may have had.

In my opinion, the way that the chemical industry can correct this situation is not by engaging in a public relations campaign to tell the public how wonderful chemicals are. The American public has a habit of not really believing industrial campaigns to change their minds in that manner. What they would believe in a situation like that would be actual deeds. I feel that the chemical industry now has a wonderful opportunity to prove that it can be genuinely interested in public welfare. I believe that it is not now genuinely interested in public welfare and that fact is basically the cause of its difficulties. For example, we are coming to the point now when new insecticides are judged primarily by their effect on people and not their effect on insects. However, the pesticide industry is still "pest-centered" and not "people-centered."

If the chemical industry would embark on a campaign to really evaluate the effects of chemicals on our entire environment, as some private researchers are attempting to do with limited funds, the public would be impressed by this endeavor to protect their interests. Every dollar spent for such research would outweigh in effect ten dollars spent for ordinary public relations.

Robert Rodale
ORGANIC GARDENING &
FARMING
Emmaus, Pa.

Dear Mr. Rodale

The pesticide industry spends millions of dollars each year on research, one of the most costly phases of which is, the study of chronic and acute toxicity hazards. No pesticide is offered on the market, no pesticide can be used commercially, until its degree of hazard has been evaluated and determined to be within safe practical limits.

The job of evaluating conclusively the effects of chemicals on our entire environment is, we are afraid, one that would be too large for a single industry to attempt. You probably know that the Magnuson Bill, before the Senate, would provide funds for research on the effect of pesticides on fish and wildlife. When hearings were held recently, the NACA supported the bill.

But while studies are going on,—and such studies are necessarily lengthy—we face the practical necessity of guaranteeing continuing control of insect pests. If unchecked, they would pose a much more serious menace than the calculated risk involved in the use of pesticides to contain them. (The Editor)

PHOTOMICROGRAPHIC EVALUATION of DIATOMITES on



Ammonium Nitrate Fertilizers

by P. L. Kadey, Jr.

Johns-Manville Research Center
Manville, New Jersey

THE economic and the agronomic values of prilled ammonium nitrate as a fertilizer are well known. It is equally well known that ammonium nitrate is very hygroscopic and, due in part to its inclination to absorb moisture from the atmosphere under humid conditions, possesses a marked tendency to cake in storage, thus reducing its suitability in this usage. (1) When a finely divided, water insoluble material is mixed with a fertilizer of this kind, the fine particles of the insoluble material stick to, and form a coating over the more adhesive surfaces of the soluble particles, and in this manner, their mechanical condition is greatly improved. (2)

Diatomaceous earth is recognized as an effective conditioning agent for reducing the caking of prilled ammonium nitrate, (3) and differences in effectiveness among diatomites from different sources have been alleged. It is not the purpose of this article to describe this coating mechanism in detail. Indeed, many phases of it are still obscure. Most investigators agree that the practical evaluation of the conditioner must depend on a long-range storage test; usually of three to six months' duration. Many of the factors that produce caking, e.g., solution or recrystalliza-

tion, do not lend themselves well to acceleration, and for this reason, results of accelerated laboratory tests designed to predict the caking behaviors of conditioned fertilizers after warehouse storage may be of questionable value. However, since a diatomite coating has been proved to be effective, it is logical to assume that the extent to which such a conditioner is capable of coating the ammonium nitrate prill is, in all probability, a measure of its effectiveness in inhibiting caking.

The goal of this investigation, therefore, has been to show that the visual examination of a prill coating by effective microscopic and photomicrographic techniques, and the proper interpretation of observations thereon made can be employed to advantage in predicting the usefulness of a diatomite as an anticaking agent. Inasmuch as the physical properties of diatomite powders vary with processing and with the nature and the source of the crude earth, it is to be expected that this variation will be reflected in applicability for prill conditioning. Although one could theorize

on the effect of these differences in physical properties, it need only be pointed out here that differences among diatomites from different sources are apparent upon visual examination; and by the test method devised and herein described, these apparent visual differences seem to be important in the control of prill caking in storage.

Preparation of Conditioned Samples

The conditioned samples used in this study were prepared by adding 3 per cent diatomite by weight to 100 grams of prilled ammonium nitrate fertilizer supplied by a leading fertilizer manufacturer, and by subsequently rolling the mixture in a 10-oz. glass jar for 10 minutes. A portion of the sample was sealed in glass jars for photomicrographic examination. Although laboratory-coated prills were used in the test series described, plant-coated prills have also been studied and the results are comparable.

When viewed with the usual array of optical instruments available in the well-equipped industrial microscopic laboratory, the nature of the

coated prills presents certain optical problems. Diatomite and ammonium nitrate are both light-colored; hence in reflected light, sufficient contrast is not provided for adequate differentiation between the bare and the diatomite-coated prill surface. For this reason, a low-power examination in reflected light, such as that provided by a conventional stereoptical wide-field microscope fails to reveal detail that may nevertheless be present. Ammonium nitrate prills are translucent, so an uncoated prill or an uncoated part thereof appears light in transmitted light. Since the refractive index of diatomaceous silica is different from that of ammonium nitrate, diatomite-coated areas absorb and diffract the passage of light so that these areas appear dark. Under proper conditions of transmitted light then, a well coated ammonium nitrate prill will appear dark upon a light background. At low power, it is difficult to transmit enough light through the sample to observe detail without a substage condenser. At higher magnification, and with the aid of a substage condenser, the research microscope reveals considerable detail, but the field of view is so limited as to rarely permit examination of more than one prill at a time.

The solution to this supposedly optical dilemma may be found in the technique herein described. The photographic data show differences among diatomite conditioners from different sources and produce representative fields for examination. A further advantage of the photographic aspect of the method is that a permanent record is provided for future study and for

comparison of several samples. It is essential that a representative number of prills be examined in order to minimize the possibility of conclusions being based on insufficient observations.

The arrangement of photographic equipment is illustrated in Figure 1. Although improvisation and variation in equipment may be tried, depending upon the experience of the photographer, the arrangement used at the Johns-Manville Research Center has been found satisfactory and is reported as a guide.

Ten prills from each sample jar were selected at random, were arranged with tweezers on a 2- x 2-in. glass plate, and were centered on an opal stage. Photographs were taken in transmitted light through the opal stage, using a 750-watt spot and a RFL photoflood. The illumination was arranged so as to allow a slight amount of incident light on the prills, thereby enhancing the illustration of surface relief. The vertical bellows was a Bausch and Lomb, 8 in. x 10 in. extended to provide 20 diameters magnification with a 2-in. focal length and 50-mm Wollensak lens. Du Pont Superior press film was used with an exposure of $f/11$ for 1 second. Film development was in Du Pont 16 D for 8 minutes at 68F. An Eastman Kodak gray scale was incorporated in the original fields so that differences in shade are real and attributable to differences in conditioner coating rather than being the result of photographic effect.

It is essential that a field be photographed immediately upon exposure to the air.

micrographic examination of diatomite coated ammonium nitrate prills.
Figure 2 (center) Uncoated nitrate

Discussion of Results

SINCE one is now able to study in detail the photographed surface of an ammonium nitrate prill coated with conditioner, certain suppositions become obvious; the more completely the prill surface is coated with conditioner, the fewer bare areas there are available for the bonding together of prills. Figure 2 illustrates the appearance of the uncoated prills. The variations in distribution among several commercial diatomite conditioners are illustrated in Figures 3 through 6. Diatomite A is from the Lompoc, California marine deposit and diatomites B, C, and D represent commercially available competitive diatomite from other sources.

Since it has been explained that, under the photographic conditions imposed, the diatomite coating appears dark on the light prill surface, the distribution of conditioner is illustrated by studying the ratio of dark to light area. An evaluation of the amount of prill surface that has been coated may be highly qualitative and may consist of a cursory visual comparison of photographic fields. This is satisfactory, for example, when comparing diatomites as different in apparent coating efficiency as samples A and C. A more quantitative comparison among samples may be derived by tracing the coated areas on transparent grids and by determining the percentage of projected area coated. For example, a gridtracing area study comparing diatomites B and C shows approximately 39 per cent and 31% projected area coated respectively.

It has been assumed that the error involved in projecting a spheri-

photographed in transmitted light.
Figure 3 (right) Ammonium nitrate coated with 3 per cent Diatomite A.

Figure 1 (left) Arrangement of equipment used at the Johns-Manville Research Center for the low power photo-



Table 1. Properties of Diatomites Tested

Sample	Bulk Density, lb/cu ft	Moisture, %	On 150 Mesh, % wt	On 325 Mesh, % wt	Graphic Areal Study, % Efficiency
A	8.4	3.6	0.1	4.5	58
B	12.9	2.7	0.1	1.9	39
C	14.2	4.5	0.6	7.6	31
D	15.3	3.5	0.2	6.5	48

cal surface onto a plane is negligible for comparative purposes. Sample A represents the best of the diatomites tested. Since about 58 per cent of the projected surface is coated with conditioner, less than one half of the surface enters into the probability of prills becoming attached at the uncoated area. The available amount of conditioner is seen to be divided evenly among the prills shown. Coupled with this uniformity is a fair degree of evenness over the surface of each individual prill. The preliminary evaluation then of diatomite A used in the conditioning of ammonium nitrate is that it should be expected to produce a satisfactory degree of anticaking efficiency.

Diatomite C, by graphic areal study of the photomicrograph, results in about 31 per cent surface conditioning. Approximately 69 per cent of the prill surface then is vulnerable to caking probability under storage conditions. In addition, it may be observed that some of the prills are monopolizing conditioner, localized excessively, to the impoverishment of other granules, that have virtually no protective coating. The preliminary evaluation then of diatomite C used as a conditioning agent on ammonium nitrate is that low anticaking efficiency would be expected in storage.

The obvious question that arises is why should equal percentages of different diatomites behave as differently, for example, as conditioners A and C? It is not the purpose of this paper to analyze the diatomites tested with the intention of rendering a conviction of inferiority in any instance. The answer to the above question does

lie, however, within the intricate science of diatomite technology. No two diatomite sources are entirely similar and the commercial term "diatomite" is known to cover a broad range from the viewpoint of physical properties and of chemical compositions. There have been about four hundred different genera and several thousand species of the diatom identified, and each commercial source is unique in the association of forms occurring within it. The range in size among the various genera is from about 5 to 1000 microns—or a factor of 200! The assemblages of diatom forms found in marine environments are usually dissimilar structurally from those deposited from a fresh water habitat. The difference from one crude to another is so marked that skilled diatomists can often "spot" the origin of unknown earths merely by their appearance under the microscope.

Coupled to this wide variation in appearance with occurrence is the multitude of physical properties that are important in diatomite fertilizer conditioners. A deposit consisting, for example, essentially of the diatom form *Melosira granulata* ("pillbox"-like form, about 10 microns diameter) would be expected to produce, upon milling and classification, a product of

different particle size distribution than that from a deposit containing a mixture predominantly of *Coscinodiscus* ("sieve-like" disc, about 150 microns diameter) and *Thalassiothrix* (hair-like form, 2 to 4 microns wide and 90 to 210 microns long).

Since conditioning agents are applied on a weight-percentage basis and since the area of prill surface coated is a function of the available specific volume of the conditioner, the effect that the particle size distribution of a conditioner has on its bulk density, hence to some degree its ability to coat the surface completely is of immediate significance. Since the purpose of this paper is to present an evaluation technique, further speculation on the relative merits of diatomite conditioners will be left to the reader. The effect of conditioning agents on mixed analysis fertilizers has been treated by others in an earlier paper. (4) It is the author's intention to modify this photographic technique to cover the illustration of conditioners on those granular fertilizers that are opaque and therefore not photogenic in transmitted light.

Summary

THE value of conditioning agents. Specifically diatomite, on prilled ammonium nitrate has been well established. (Continued on Page 119)

Figure 4 Ammonium nitrate coated with 3 per cent Diatomite B

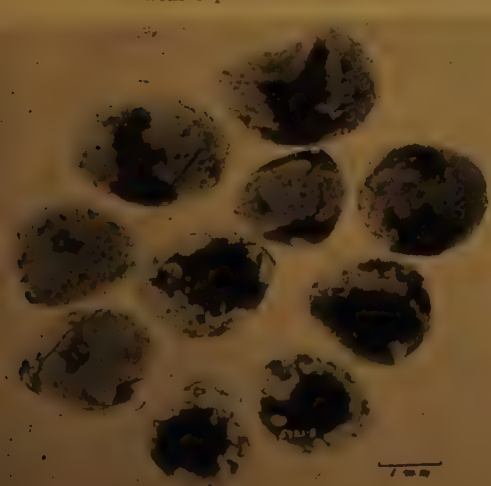


Figure 5 Ammonium nitrate coated with 3 per cent Diatomite C

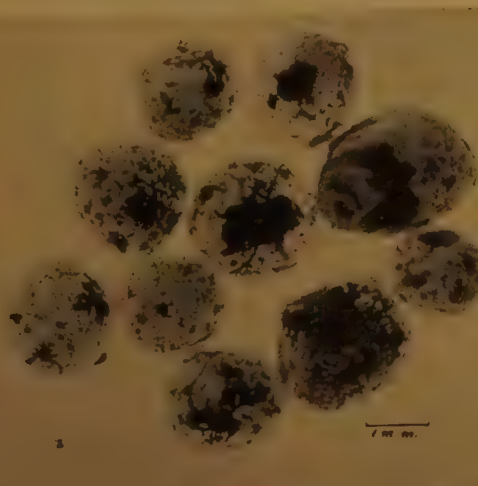
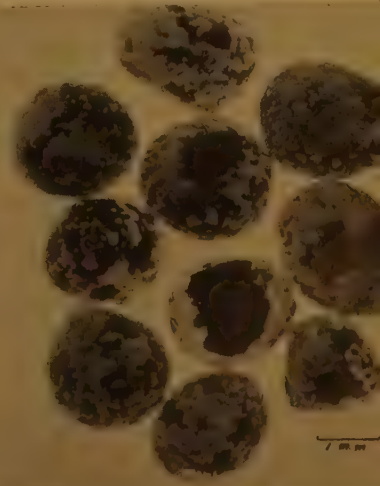


Figure 6 Ammonium nitrate coated with 3 per cent Diatomite D



What's

New

in

Pesticides

?

PHOSTEX

Food Machinery and Chemical Corp.
Middleport, New York

PHOSTEX is a trade-marked name for the chemical, bis (dialkoxyposphinothiyl) disulfide, in which the alkyl groups are ethyl and 2-propyl, a product of Niagara Chemical Division, Food Machinery and Chemical Corporation.

Phostex has a very effective use for the control of the blister mite complex on pears. For this control, Phostex 8.0 Miscible is used at the rate of one pint per 100 gallons of water and applied at post-harvest. This spray not only controls blister mites but also foliar mites such as European red mite, brown almond mite and two-spotted mite. Severe blister mite infestations may require an additional dormant or delayed dormant spray with Phostex. It is quite possible that future research will demonstrate that Phostex is a useful material for the control of bud mites associated with other fruit crops as well as ornamentals.

Phostex has been developed for use currently as a dormant and late dormant pesticide to control certain scale insects, mites and aphids on apples, peaches, pears, plums, nectarines, prunes and almonds. These applications are in combination with oil sprays. Present registered uses are for Pacific Coast States.

Phostex is being marketed by Niagara in the Pacific Coast States in the following formulations:

Niagara Phostex Dormant Oil Spray — containing 0.6 lbs Phostex per gallon in a dormant oil base.

Niagara Phostex 8.0 Miscible— containing 8.0 lbs. Phostex per gallon.

Niagara Phostex has a low order of mammalian toxicity and in pesticide applications is considered to be relatively safe to warm blooded animals.

The two formulations of Phostex mentioned above are being marketed by Niagara Agricultural Department for their registered uses in the Pacific Coast States.

EPTAM

Stauffer Chemical Co.
New York

EPTAM (EPTC) is a new pre-emergence selective herbicide developed by Stauffer Chemical Company. It is now being offered experimentally for further research and evaluation. Extensive greenhouse and field trials during the past two years indicate that Eptam has a number of interesting advantages.

Most plants have been tolerant to post-emergence applications. In addition, many crops, ranging from forage legumes such as clover and alfalfa to vegetables such as corn, carrots and beets, are tolerant to applications made prior to emergence. When applied any time prior to weed emergence Eptam has given excellent control of all grassy weeds against which it has been tested, including both yel-

low and purple nutgrass, and many broadleaf weeds, including red-root pigweed and purslane.

Weed control for periods as long as five months has been obtained, although the chemical residual action has been relatively short. Indications are, so far, that no residue problem exists.

Rates of application vary according to the crops and weeds involved. Almost all grassy weeds have been susceptible to application rates of one to five pounds per acre. Control of nutgrass requires five to ten pounds per acre. Broadleaf weed susceptibility has ranged from one to ten pounds per acre. Crops tested ranged in tolerance from one pound per acre to ten pounds per acre, with most, including corn, alfalfa, beets, clover, resistant to five-to-ten pounds per acre.

Soil moisture level at time of application greatly influences the performance of soil surface applications of Eptam. Wet soils (those with a moisture level in excess of that required for seed germination) have resulted in poor weed control, whereas applications to dry soils (with only the minimum amount of moisture needed for good seed germination) have given excellent weed control. Good weed control will result in wet soil applications if Eptam is incorporated to a 2-4" depth immediately following application. However, crop tolerances differ with this method.

New Pesticides reviewed in this issue:

Phostex • Eptam • HCA

DEF • Thiodan

Dyrene

General Chemical's marketing program.

Hexachloroacetone (HCA) has the structural formula



and is produced by direct chlorination of acetone. The technical product produced for use as an herbicide contains no less than 90% hexachloroacetone and no more than 10% related chlorinated ketones, and is a heavy liquid weighing approximately 14.4 lbs./gal. A series of field tests showed that HCA increases the herbicidal activity of oils against weeds in general and against Johnsongrass and other hard-to-kill grassy weeds in particular. When these findings were established conclusively in 1957, General Chemical registered two products based on technical HCA for non-selective weed control.

The present registration applies to use only in non-crop areas such as railroads, pipelines and other right-of-ways, roadsides, guardrails, drainage ditches, fence rows, farm building areas, industrial storage and building sites, etc. The products are "HCA Weed Killer Concentrate" containing 20% technical HCA by volume, for dilution with locally available oils, and "HCA Weed Killer" containing 2% technical HCA by volume in an aromatic petroleum for use without dilution. This year, several experimental HCA-oil concentrates will be added which can be applied with water or in mixtures with additional oil and water. Various special formulations, such as granules, are also available for experimental purposes. Commercial use of these products for weed control in crops, such as cotton, corn, sorghum, etc., awaits completion of residue studies now in progress.

HCA is not particularly toxic

to warm-blooded animals (acute LD₅₀ to rats—approx. 1290 mg./kg., acute percutaneous LD₅₀ to rabbits—approx. 1510 mg./kg.) but cautions against contact with skin, eyes or clothing and inhalation of mist or fumes in handling and applying products containing it are advised.

1958 labels for appropriate HCA Weed Killer products will carry specific directions for control of Johnsongrass and Nutgrass as well as for general, non-selective weed control in non-crop areas.

General Chemical sells "HCA Weed Killer Concentrate" in 50, 30, 5, and 1 gallon containers with the latter packaged four to a carton. "HCA Weed Killer" can be purchased in tank car quantities. HCA is available through farm supply dealers throughout the U. S.

HCA

General Chemical Co.
New York

HEXACHLOROACETONE (HCA Weed Killer) has been marketed commercially by General Chemical Division, Allied Chemical & Dye Corp. for a little more than a year. General Chemical began its investigation of the herbicidal qualities of HCA as early as 1947. Samples were distributed to various agricultural experiment stations for testing starting in 1953. The systemic effects of HCA as an additive to oils for the crown treatment of Johnsongrass sprouts in cotton and non-crop sites were verified at College Station, Texas, in 1953. This characteristic of HCA, confirming numerous other field tests, provided the impetus for

DYRENE

Chemagro Corporation
New York

DYRENE, a foliage fungicide developed by Ethyl Corporation and Pittsburgh Coke and Chemical Co., is manufactured under license by Chemagro Corporation. A 50% wettable powder is marketed in 50-pound drums for commercial use. Formulations available for testing are listed below:

50% wettable powder
5% dust

Technical analytical standard
(for special research purposes only)

Dyrene is compatible with most chlorinated insecticides and with lime in tank-mix. It is stable in neutral or slightly acid media, and decomposes fairly rapidly in basic media at elevated temperature. The wettable powder mixes readily with all waters in which it has been tested, and is suitable for all power operated ground spray equipment where mechanical agitation is present. Where the dust formulation is used, Chemagro suggests that a range of dosages be tested.

This fungicide is reported to be highly effective in the control of early
(Continued on Page 109)

WASHINGTON REPORT

By Donald Lerch



THE spring planting race is on and every day of favorable weather will help to boost industry sales. The battle to push the sales curve up is meeting two counteracting forces. One is the late spring which has the effect of telescoping the number of effective selling days. Second is the announced intention of farmers to plant the smallest crop acreage in 40 years!

These factors are seen in Washington as having a much greater effect on consumption of agricultural chemicals than any further political or Congressional action for the remainder of 1958. In fact, the agricultural situation is pretty well stalemated in Washington. The Democratic Congress can't get past the Presidential veto. Spot checks with Congressional and administration leaders show there is little likelihood of reconciliation on the main points of difference. Essentially the Democratic Congress wants higher price supports, whereas Secretary Benson intends to use lower prices as a means of forcing a reduction in farm output.

Here's the scorecard on the acreage farmers intend to plant according to latest USDA surveys. The figure beside the crop compares the expectation this year against last year's actual planting.

Corn	Up 1½%
Wheat	Up 6.6%
Oats	Down 8%
Barley	Down 3%
Sorghum	Down 13%
Flaxseed	Down 18%
Soybeans	Up 10%
Peanuts	Down slightly
Tobacco	Down 2.4%

While the individual declines in most cases are not cause for alarm—

it should be recognized that acreage of harvested crops continues to decline. Acres planted probably will be the smallest for any year since 1917.

Despite this probable reduction in acreage by next October 1, the end of this crop season, probably 16 million tons of feed grain will be on hand, most of it in government hands. This would be about twice the normal carryover.

* * * * *

Here's a trend that may affect your marketing plans—corn acreage continues to decline, — whereas soybean acreage continues to climb. In fact, corn acreage has been declining since 1929 and has gone down from 98 million acres to 73 million acres. Starting from practically zero a few decades ago, soybeans are now grown on 20 million acres, and this figure could double within a relatively short period of time. Some agricultural specialists think soybeans may some day fight for king corn's crown!

* * * * *

Marketers of fresh fruits and vegetables are still uncertain as to the exact ground rules under which they must operate so far as telling the public what pesticides and preservatives have been applied pre- and post-harvest. The Food and Drug Administration recently proposed an amendment to existing regulations which would exempt from present labeling requirements fruits and vegetables bearing chemical preservatives applied prior to harvest. The change would still leave post harvest applications of fungicides subject to labeling requirements. The proposed amendment, however, specifically defined the term "chemical preservative" to exclude insecticides and herbicides.

A number of farm and food marketing groups challenged the wording of the amendment, and cited the impracticability of complying with the requirement that they label citrus in the market to show fungicides used on it, either pre or post-harvest. Following consideration of testimony presented, the Food and Drug Administration issued a clarifying statement setting up procedure to be followed. (See next page for full text.)

* * * * *

One of the somewhat neglected areas for the use of some agricultural chemicals is in the protection of crops in storage and in transit. Despite many advances made in growing, harvesting, and shipping fresh produce to market, enormous waste still occurs.

USDA, for example, has estimated that of the fruit marketed 11% is lost during the marketing process. The loss figure given for vegetables is 8%. In dollar figures this totals up to around \$663 million in losses per year.

Insect damage, molds and bacteria rank high among the causes of these huge losses. Thus many of the losses conceivably could be reduced through the protection of crops in storage and transit by the proper use of agricultural chemicals.

A big 'if' in any program to reduce these marketing losses is whether the public can be educated to the benefits they can expect from improved protection of the foods they consume.

* * * * *

Concern about improving company communications with farmers, and other major users of agricultural chemicals, is spreading to all segments of the industry. The feeling that many people have not been getting as

much accurate information about fertilizers and pesticides as they should be. But during recent months new interest has been shown by the industry in exploring ways to educate more people on why and how these products should be used.

* * * * *

Right on the heels of the survey of "Farmers' Attitudes Toward the Use of Fertilizer" sponsored by the National Plant Food Institute, NAC has announced that major emphasis at its 25th Anniversary meeting in Augusta, Georgia, October 29-31, will be on public relations and methods for developing new markets.

A clue to the thinking of industry leaders is their belief that the future for all segments of the agricultural chemicals industry is bright if everyone in the industry takes a more aggressive stand in marketing products. Greatest need appears to be improved marketing at the grassroots level. Two significant facts the NPFI survey turned up were that the average farmer's knowledge about fertilizers is lower than most people thought it was and that many believe national stories do not relate to specific problems in their own farming areas.

It is generally recognized that industry information and education programs have been getting across to the advanced and better educated farmers. But information has not been reaching farmers and others who are normally slow to adopt new products and new practices in a form which excites their interest. By moving the sources of information closer to the grassroots, industry leaders hope to relate product uses and benefits more closely to specific area conditions.

Tied in with the industry's desire to improve marketing is the feeling that every effort to improve public understanding of industry products will help to ease pressures for excessive regulation of industry products. Knowledge is a powerful force. The feeling is that the more people know about what the industry is trying to do, how it is trying to do it, and the benefits everyone can expect from it, the faster the industry will be able to realize its bright future.

* * * * *

A move to broaden export sales of pesticides is being taken by NAC's Foreign Trade Committee. About 100 people interested in world health and in overseas uses of agricultural chemicals will be entertained by the Committee in Washington, D. C., May 16. Among the guests will be representatives of the World Health Organization, Pan American Union, U. S. Public Health Service, Commerce Department, International Cooperation Administration, UNICEF, USDA, and Agricultural Attaches of foreign embassies in Washington. U. S. exports of pesticide chemicals, incidentally, have been climbing steadily during the past few years and exceeded \$80 million value in 1957, or over 20% of total U. S. pesticide production.

* * * * *

Many of the wildlife organizations headquartered in Washington

and New York have been demanding more scientific information about the effects of pesticides on fish and wildlife. When pinned down, most admit that a considerable amount of research already has been done in these fields by USDA and U. S. Fish and Wildlife Service. Their view is that much more information is needed. NAC, which was founded 25 years ago with the promotion of pesticide research as one of its objectives, has joined with wildlife organizations in supporting the Magnuson Bill. This bill would authorize additional funds for continuing studies to provide basic data on various chemical controls so that forests, croplands, and marshes can be sprayed with minimum losses of fish and wildlife. The Magnuson Bill—as an authorization measure—does not provide funds for the research, but, in effect, would express Senate en-

(Continued on Page 122)

F. D. A. Rules On Citrus Fruit Labeling

PLACARDS may be used on retail displays of bulk citrus fruit to show that the fruit has been treated with a preservative without naming the chemical used, under a proposed regulation published by the Food and Drug Administration.

The action was taken as a result of petitions by grower organizations which contended that label declaration of preservatives on bulk fruit is impracticable.

This label declaration is required by law. Naming the preservative chemical is also required by law, unless this is found to be impracticable. The proposed regulation is one step in arriving at a final determination on that point.

FDA Commissioner George P. Larrick said the proposed regulation was issued for the purpose of obtaining as much information as possible as a basis for a final decision. The proposal would not change the present requirement of the law that preservatives may be used only in a way that will be safe.

Requests for exemption from the requirement for declaration of the preservative were filed by the American Farm Bureau Federation, United Fresh Fruit and Vegetable Association, and Sunkist Growers. Evidence was submitted tending to show that the declaration of the specific preservative used was impracticable because retailers may have at the same time several lots of the same citrus fruit bearing different preservative treatments. Petitioners said this could lead to errors in the labeling of bins, while to provide separate dis-

plays would be impracticable because of the increased labor cost and display space required.

Under the FDA proposal, citrus fruit in packages, for example crates or net bags, would continue to show the common or usual name of any preservative used. FDA said that the petitions did not furnish reasonable grounds for publishing a proposed exemption that would apply to citrus in packaged form, to citrus before it is offered for retail sale, or to any other fruit or vegetable, whether or not in packaged form.

The Food and Drug Administration has also published a final regulation exempting from any label declaration preservatives which are applied to fruits and vegetables prior to harvest.

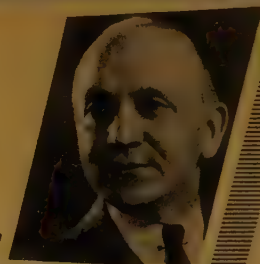
This regulation, first issued on July 31, 1957, is based on the conclusion that it is impracticable for a produce shipper to determine all of the different fungicides used by various farmers on growing crops before harvest and to declare them in labeling. Grower organizations had asked for a blanket exemption from the requirement that the use of chemical preservatives be declared on fresh fruits and vegetables, on the ground that such labeling was "unnecessary" and "impracticable." In effect, FDA has declined to give such a blanket exemption but exempted those preservatives which are added prior to harvest because it is impracticable to declare them.

Both FDA statements were published in the April 4, 1958, issue of the Federal Register.

Fertilizer Views and News

Dr. Sauchelli is Chemical Technologist for National Plant Food Institute.

Dr. Vincent Sauchelli



Fertilizers and Farm Income

TO use fertilizer is to make money.

That is one conclusion that can be drawn from the recent NPFI study* of farmers' attitudes toward the use of fertilizer. It deserves to be emphasized by dealer, salesman and all educational agencies. *Fertilizer means profit to the farmer.*

The Analytic Report shows clearly that a high level usage of fertilizer pays off. For example, in 1956 the average gross income per acre for farmers operating 100 acres or more, regardless of crop grown, was \$46. For high level users of fertilizers, the average gross income was \$66. Non-users of commercial fertilizer had the relatively low gross income of \$37. Thus the farmer who used a fairly high level of fertilizer made \$29. more per acre than the non-user and \$20. more per acre than the general average. (High level means use is close to standard for most economical operation for crop and soil involved.)

Fertilizers are economic commodities in today's farm business. They increase both yields and nutritional quality. Business farmers have learned how to estimate the expectable gains in yield from various rates of fertilizer applications. They also can easily calculate the actual cost of ma-

terials and labor involved in a specific application of fertilizer. Furthermore, in the case of most crops it is generally possible to estimate weeks in advance the minimum price they will bring in the market place. Thus, the profitability of the fertilizer can be estimated as the difference between the input cost and the market return of the crop. This difference can be assessed on a cash-per-acre basis or as a percentage of the fertilizer cost.

In the large majority of farm crops the financial returns on such short-term investments represented by the fertilizer cost can rarely be matched by other forms of investment. Many bankers are becoming aware of this fact and are now more disposed to make loans for fertilizer purchases.

When farmers cut down on fertilizer usage from previous levels, as is reported being done at present in some parts of the country, they lose considerably more farm income than they save from the reduction. These use and profit relationships are shown by the following data from Great Britain and our own country.

British records published in World Crops (October 1953), and given by the Farm Economics Branch of the University of Durham, tell a convincing story in the following summary representing a 5-year survey:

Table 1

	Group 1	Group 2	Group 3
Number of farms	12	11	12
Average expenditure on fertilizer per acre	29s 10d	19s 2d	8s 0d
Fodder-producing acreage per cow	3.02	3.06	3.01
Av. milk yield per cow (gal.)	671	641	542
Av. milk yield per acre (gal.)	222	209	180
Value of milk per acre calculated at pool Prices, 1942-47	£28 13s 6d	£26 19s 11d	£23 5s 0d

Sir James Scott Watson, a British authority said in a recent speech: "The evidence from plot experiments is borne out by the findings of farm management economists. To take but one example, the farmers of the six most profitable holdings, in one particular group, spent 49 shillings per acre on fertilizers; those of the six least profitable holdings spent only 17 shillings. . . . One fact is that large farmers, on the average, use more fertilizers than small farmers; expenditures on fertilizers, as a proportion of total outgoings, is about twice as high on the over-500-acres farms as on the under-50-acre group."

A typical record from this country showing a similar use and profit relationship is this from the Missouri Agricultural Experiment Station studies. By using the amount of fertilizer recommended by the Missouri AES as contrasted with the average used at the time, a high level fertilizer farmer could expect to profit as shown:

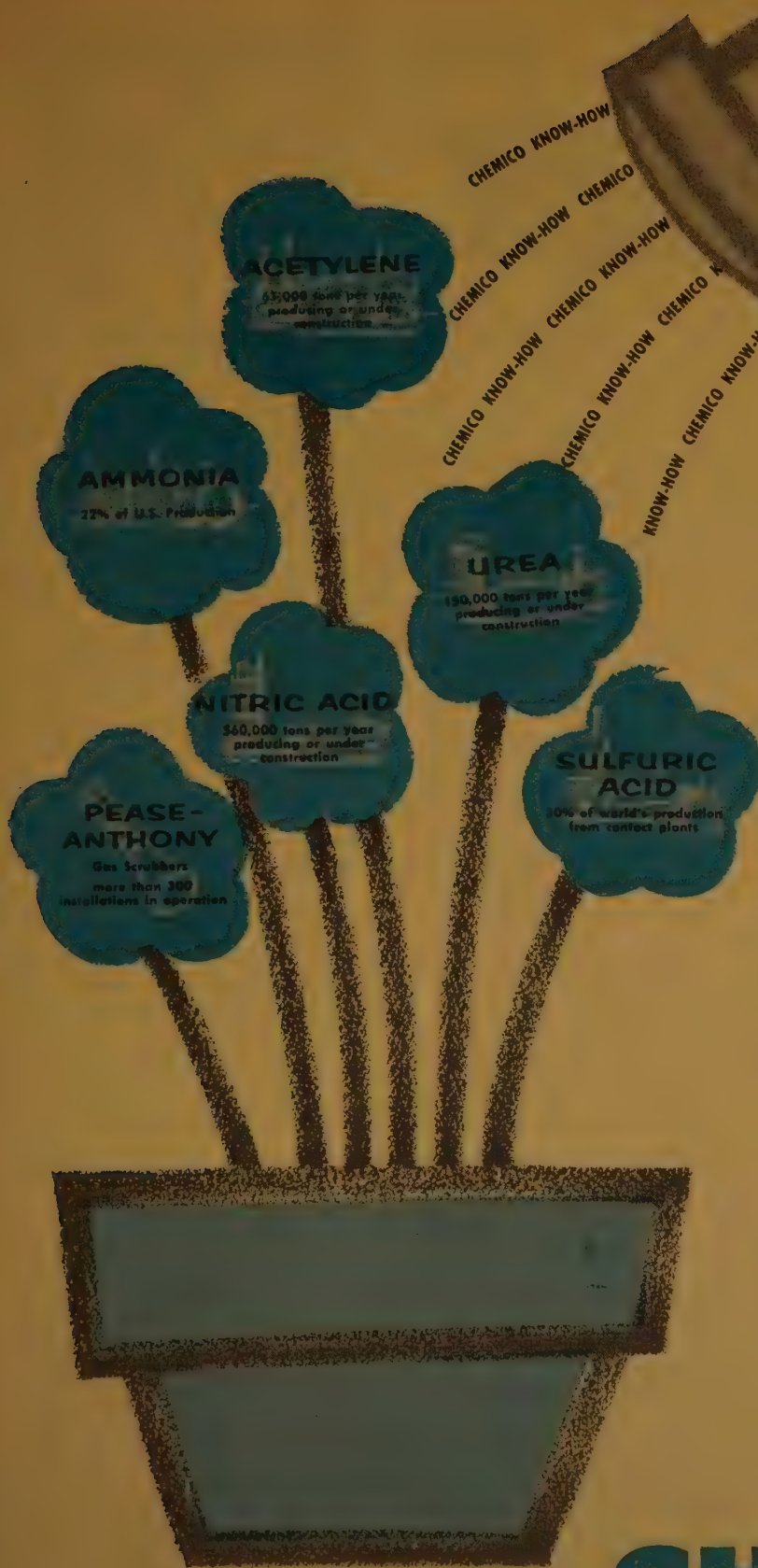
Table 2

	Reduce Fertilizer Average	Unit Cost-Increase Fertilizer Used	Profits Recommended
Yield per acre	40 bu.	65 bu.	
Corn price	\$1.40	\$1.40	
Income	\$56.00	\$91.00	
Cost per acre	39.00	55.00	
Profit per acre	\$17.00	\$36.00	

The difference between market returns and production costs is the decisive factor in profits. A farmer may increase production costs, that is, use more fertilizer; but, if he gets more return per acre than if he did not, that increase is justified. So, you see,

(Continued on Page 121)

*National Analysts: A survey, released by National Plant Food Institute, 1958.



DESIGN, ENGINEERING AND CONSTRUCTION...

Chemico's engineering and construction accomplishments have always been a matter of public record. In presenting some of the highlights of that record at this time, we are simply restating the reasons for Chemico's pre-eminence in the design and construction of chemical and petrochemical plants. No other single chemical engineering firm has had such broad experience and so outstanding a record in so many fields.

Chemico designed plants and equipment, producing a wide range of agricultural and industrial products, are operating profitably in forty-three states, and in virtually every industrialized country on earth.

Consult Chemico the next time you consider the expansion, development or diversification of your production facilities.

CHEMICO

CHEMICAL CONSTRUCTION CORPORATION

525 West 43rd Street, New York 36, N. Y. • Cable Address: CHEMICONST, New York

CHICAGO • DALLAS • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

TECHNICAL SECTION



Chemical Tranquilizer Increases Crop Yield

A CHEMICAL tranquilizer for plants has been developed by United States Rubber Co., New York. It will be marketed for use on selected crops for the first time this season.

The chemical is N-Meta-tolyl phthalamic acid, and is called Duraset-20W. It increases plant yields by reducing the effects of shock and stress caused by such conditions as heat spells, sudden cold snaps, prolonged rain, drought or over-fertilization.

It is reported to work in two ways: When sprayed during blossom time it helps plants and trees retain fruit-producing blossoms in the face of poor growing conditions. Secondly, it increases the usual number of blossoms formed by some plants, such as greenhouse-grown tomatoes, if sprayed when the plant is only a few weeks old.

For the farmer, the chemical could be an economical form of "weather insurance" on many crops. Greenhouse tomato growers could use it to increase blossom production, and consequently yields. On some crops, notably cotton, it can be used to step up yields by enabling the plant to retain more of the blossoms it forms.

A report from U. S. Rubber Co. states that in field tests, the chemical has increased lima bean plant yields up to 90 per cent; doubled the amount of fruit formed on cherry trees; raised by one-third the number of fruit formed on pineapple-orange trees, a variety of orange, and increased yield of cotton plants from 10 to 30 per cent. It has also been used successfully on alfalfa, cranberries, pea beans, pears, snap beans, soybeans and strawberries.

Based on these yield increases, the results of experiments conducted over several years, the rubber company feels the chemical is now ready for full scale commercial grower tests on such crops as desert-grown cotton, lima beans, greenhouse tomatoes and Northwest cherries. Laboratory research and field testing will continue however on these crops and many others to increase the product's effectiveness, and to develop applications for additional crops.

Researchers are not completely certain how the chemical works. They theorize that it corrects an auxin imbalance in plants. Auxins are hormones formed naturally by plants, and a hormone deficiency generally results when a plant is stressed or shocked. Apparently the chemical corrects this deficiency and allows the plant to bear more abundantly.

Duraset-20W is a wettable powder. Small amounts of it are mixed with large quantities of water, and then sprayed on plants. It is absorbed through the leaves, and then moves through the plant. Where it goes to work in the plant isn't known, but researchers do know that it acts fast. Just 24 hours after it is sprayed, it is impossible to detect as little as two-tenths of one millionth part of the chemical in the plant.

It was jointly discovered by Dr. Allen E. Smith, chemist, and Dr. Albert W. Feldman, plant pathologist, of the rubber company's Naugatuck Chemical division. Its reaction on plants was first noticed at the chemical division's experimental farm in Bethany, Conn. Further development work was done at several universities.

Dr. E. M. Rahn of the University of Delaware discovered its application on lima bean plants. Its ability to increase flowering in tomatoes was discovered by Dr. S. W. Wittwer and Dr. F. G. Teubner of Michigan State University. Its use on cotton plants was developed by R. A. Kortsen of the University of California, working with J. P. Corkins of Naugatuck Chemical's field development staff. Use of the chemical on cherry trees was developed by researchers in the Northwest and these results were duplicated in the Midwest by W. S. Morgan of Naugatuck Chemical's field development staff.

Methyl Bromide for Sauba Ant

Increasing damage by fire ants in the south and southwest has made necessary the present fire ant control program in Florida, Mexico, etc. In view of the current interest in this pest, the following summary of investigations using methyl bromide for control of the sauba ant in Brazil, may be pertinent, and offer some suggestion for studies on the use of this material in fire ant control.

The Brazilian research was conducted by M. Autuori and J. V. Pinheiro, of Sao Paulo, and was reported in *O Biologico*, 16, No. 8, August, 1950:

Some 273 nests of sauba ants made up the experiment, in which 1, 2 and 3 cubic centimeters of methyl bromide per square meter of external surface of ant nests were tested in 1 and 2 applications.

Best results were obtained using a dosage of 3 cubic centimeters of methyl bromide in one application per 10 square meters of external surface of the nest. 87.84% of the ants

were destroyed in this treatment. At 2 cubic centimeter dosages, 81.02% control was obtained. Highest control was obtained when methyl bromide was applied through the maximum number of holes in the ant nest (as compared with results obtained in high volume through a small number of ant tunnels).

O.K. Mylone For Seed Beds

Mylone soil fumigant has been granted federal label acceptance by the United States Department of Agriculture for pre-planting use on seed beds of certain vegetables, according to its manufacturer, Union Carbide Chemicals Co., Division of Union Carbide Corp., New York.

The product formerly was available for use on vegetable seed beds only on an experimental basis. It is now commercially available to growers for pre-planting treatment of tomato, pepper, cabbage, egg plant, and lettuce seed beds, the company states.

Mylone controls weed seeds, soil fungi, and nematodes. It is being used on ornamental propagating beds and tobacco seed beds as well as vegetable seed beds. Experimental work is continuing in many different states on forest tree seed beds and on turf.

Sea-Gro Soil Conditioner

Wright Feeds, Paramount, Calif., is offering Sea-Gro, a new plant stimulator composed entirely of concentrated Pacific Coast kelp, processed to a mealy consistency.

Extensive research on the part of Wright Feeds, together with reports of unusual results received from users in many parts of the country, are said to indicate that the product may well prove to be the ideal concentration of ocean minerals to stimulate soil bacteria which converts nitrogen into nitrates. Sea-Gro is reported in many instances to increase the protein and Vitamin A in alfalfa, the size and flavor of fruits and vegetables, the sugar content of citrus fruits, and even the color and aroma of flowers.

The responses of various crops to commercial and experimental fungicides are contained in a bound booklet giving the complete 1957 fungicide test results.

Studies on DAP as a Base Goods for the Small Mixer

TVA HAS, and is, carrying out extensive tests on the use of diammonium phosphate as a base goods in dry-mixed (blended) fertilizers, and has studied its use in the production of high-analysis granular fertilizers. Two papers have been published,* and additional information is being developed, because continued interest by industry in using diammonium phosphate in a wider range of mixtures brings up new problems. Our work has shown that diammonium phosphate is compatible with commonly used fertilizers, and that it can be used as a base to make a variety of grades of mixed fertilizer of good physical properties. Some of the mixtures prepared and tested in our laboratory are discussed below.

Mixtures of diammonium phosphate with ammonium sulfate and potassium chloride (10-20-30, 10-20-20, and 15-15-15) were satisfactory when conditioned with 3 per cent of kaolin clay, kieselguhr, or calcined dolomite. The mixtures conditioned with 3 per cent of kaolin clay or kieselguhr had medium bag sets after 1 month but no lumps after the bags were dropped. Only very light bag set was observed when calcined dolomite was used as the conditioning agent.

Mixtures of diammonium phosphate with ammonium nitrate and potassium chloride (10-20-30, 12-24-24, and 20-20-5) tended to cake more than did mixtures containing ammonium sulfate and potassium chloride. Calcined dolomite cannot be used as a conditioner for these mixtures because of its reaction with ammonium nitrate to release ammonium and to form calcium nitrate and water. With these mixtures, about 3 per cent of kieselguhr gave satisfactory storage. Kieselguhr was somewhat more effective than kaolin clay since, generally, about 10 per cent of the latter material was required. Best results were

obtained and less conditioner was required in most tests in which coarse instead of fine potash was used. The 20-20-5 product is produced by several mixes in fairly large quantities for use as a fishpond fertilizer.

Mixtures of diammonium phosphate, calcium metaphosphate, and potassium chloride (10-30-20, 8-24-24, 6-18-36, and 4-24-24) had practically no bag set and no caking when conditioned with calcined dolomite. These mixtures had medium bag sets when conditioned with 3 per cent by weight of kaolin clay.

When diammonium phosphate was mixed with concentrated or ordinary superphosphate, there was a chemical reaction which resulted in some ammoniation and generation of heat. There was no loss of plant nutrient. However, the mixtures tended to set up while "fresh." Conditioning the mixtures, or permitting them to cure for about a week before bagging, or both, prevented caking in storage. Satisfactory results have been obtained with this combination of raw materials for the following grades: 6-24-24, 5-20-20, 8-24-24, 6-18-36, 10-30-20, 5-15-30, and 9-27-18. Calcined dolomite was found to be an excellent conditioner for mixtures that did not contain ammonium nitrate.

Diammonium phosphate, as produced by TVA, is a fairly coarse crystalline material containing 21 per cent N, 53.7 per cent P_2O_5 , and 0.1 per cent moisture. Its hygroscopicity is about the same as that of ammonium sulfate and potassium chloride, since it has a critical humidity of about 85 percent at 86°F. Diammonium phosphate will cake in bags or in bulk over a period of months unless treated with a conditioner. Bulk material formed a firm cake in a 20-foot pile, but was easily reclaimed with a power shovel. Conditioning diammonium phosphate with 1 to 3 per cent of calcined dolomite prevented bag set and caking and was somewhat more effective than kaolin clay or kieselguhr. Calcined dolomite also was very effective as a conditioner for mix-

*Storage Properties of Diammonium Phosphate Alone and in Admixture with Other Fertilizer Materials." Julius Silverberg and F. G. Heil. *J. Agr. Food Chem.* 5, 436-41 (June 1957).

tures that did not contain ammonium nitrate. Kieselguhr was somewhat more effective than kaolin clay.

Experimental work is being continued to identify other grades that can be made advantageously with diammonium phosphate.

Comments by T. P. Hignett of the TVA, Wilson Dam, Ala., presented at the Fertilizer Industry Round Table meeting in Washington, D. C., November, 1957.

The 1958 meeting of the Fertilizer Industry Round Table will be held October 29-31 at the Sheraton Park Hotel, Washington, D. C.

Metering Considerations In Handling Liquid Fertilizers

THE latest farm revolution is the development of complete analysis liquid fertilizers. In the million-dollar fertilizer market, this new form is rapidly attracting the attention of equipment manufacturers, basic raw material manufacturers, tank and applicator manufacturers, agriculture colleges, farm implement manufacturers, and fertilizer-farm implement dealers.

Why? Simplicity. That's the answer the typical farmer gives when asked why he likes liquid solution fertilizers. One big advantage for liquid fertilizer is versatility—it can be used in so many different ways. It can be applied with a truck, a trail-behind rig, or a tractor-mounted applicator. It can be applied while plowing, planting, cultivating, or laying-by as a top dressing or side dressing during any season of the year. Theme song of the liquid fertilizer business appeals to farmers — “no bags to lift; no bags to haul; clean work; no dust; no unpleasant fumes.”

The heart of any complete solution fertilizer manufacturing plant is, of course, the actual equipment used in the formulation and processing of the various analyses of finished liquid fertilizers.

One production problem in making liquid fertilizers is that of metering. A recent letter from H. F. Barrett, Buffalo Meter Co., Buffalo, N. Y. carries the following observations with reference to metering of viscous fluids:

“Where rate of flow indication is the primary measurement sought, or where the product to be measured is a slurry,—or where the product being measured is corrosive to stainless steel of Type 316, then a non-displacement magnetic meter is advantageous. Where a large percentage of phosphoric acid applications are for the measurement of liquid acid free from solids, the volumetric displacement type of meter gives the desired results more directly and frequently at less cost.”

A discussion on metering viscous fluids was reported in the February issue of *Agricultural Chemicals* (page 71.) Additional comments on metering anhydrous ammonia and high vapor pressure liquids appear in the April issue (page 45).

BULLETIN AVAILABLE

COMMERCIAL FERTILIZER REPORT FOR 1957 by H. J. Fisher. A 56-page report on inspection and analysis of commercial fertilizers in 1957. Bulletin 607, Oct. 1957. The Connecticut Agricultural Experiment Station, New Haven.

TRIPLE THREAT CHEMICAL!

SPRAYS • DUSTS • FERTILIZER

TRIANGLE BRAND COPPER SULFATE

Successful growers prefer fertilizer and fungicide formulations containing Triangle Brand Copper Sulfate. They know that in fertilizers it is necessary for enrichment of the soil; in fungicidal sprays, where Bordeaux Mixture is the most reliable, or in copper dusts, Triangle Brand Copper Sulfate has definitely proved its superiority over organic materials.

Use of Triangle Brand Copper Sulfate in sprays, dusts and fertilizers results in larger and healthier crops, meaning MORE PROFIT for the grower and MORE PROFIT for the mixer or formulator who serves him.

Triangle Brand Copper Sulfate, which will increase your profits, comes in these convenient forms:

INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

DIAMOND (snow) small or large crystals, containing 25.2% metallic copper.

BASIC Copper Sulfate in powder form, containing 53% metallic copper.



Contact us today for further information on Triangle Brand Copper Sulfate and its use in agricultural formulations.



PHELPS DODGE REFINING CORP.

300 PARK AVE. NEW YORK 22, N.Y. • 5310 W. 66th STREET, CHICAGO 38, ILL.

Arcadian News

Volume 3

For Manufacturers of Mixed Fertilizers

Number 5

How to Make More Money from Mixed Fertilizers

For Greater Profit — Put More N in N-P-K

Most of the leading fertilizer-consuming crops require more nitrogen than any other plant food. Yet, the average mixed fertilizer contains less nitrogen than phosphoric acid and potash. Farmers make up the difference with extra applications of straight nitrogen materials. More nitrogen is sold as straight materials than in mixed fertilizers.

This situation represents a golden opportunity for you as a manufacturer of mixed fertilizers. You can get more of the nitrogen market and more of the total fertilizer market by putting more nitrogen in mixed fertilizers.

Profitable Arithmetic

You help the farmer save money and you make more money from nitrogen, when you sell it as an ingredient of mixed fertilizers. You get more of the farmer's fertilizer dollar when you supply his nitrogen needs with mixed fertilizers than when you sell him low-nitrogen mixtures that must be supplemented with extra applications of nitrogen.

Figure it out for yourself! Compare your profit per unit of nitrogen in straight materials with your profit per unit of nitrogen in mixed fertilizers. You will quickly see where your profit lies. And some of your customers may buy their mixed fertilizers from you and their straight nitrogen elsewhere. This means that your profit goes elsewhere.

The Aim and Purpose

Of course, it is not practical to supply all the nitrogen needs of some crops on some soils with mixed fertilizers. But, for most crops on most soils, it is practical, efficient, economical and profitable to supply total plant food

(Continued on following page)



(Continued from preceding page)

needs (including sufficient nitrogen) with mixed fertilizers.

The Aim and Purpose

The basic aim and purpose of "complete" fertilizer is to give the farmer, in one well-conditioned product, all the plant foods that his soil needs to produce the yields he wants. With a well-balanced fertilizer, he can feed his crop with one trip across his field.

When mixed fertilizer contains sufficient nitrogen, it may not be necessary for the farmer to side-dress or top-dress with supplemental nitrogen. This saves him time, labor and equipment and prevents soil compaction by keeping heavy machinery off his plowed and planted fields. Inability to apply extra nitrogen, due to bad weather or lack of time, cannot hurt his yield.

Farmers Know Advantages

More and more farmers are learning the advantages of high-nitrogen mixed fertilizers. Many experiment stations are recommending 2-1-1, 1-1-1 and 1-2-2 ratios. There is a growing demand for such mixtures as 16-8-8, 14-7-7, 12-12-12, 10-10-10 and 6-12-12. Farmers know that most crops use twice as much nitrogen as phosphoric acid . . . and more nitrogen than potash, especially where crop residues are plowed back.

The Big Picture

Despite widespread recognition of the obvious need for more nitrogen, the average mixed fertilizer contained 5.39%



You help your dealer get exclusive customers and repeat sales when you supply the farmer's complete plant food needs with mixed fertilizers.

nitrogen, 12.08% phosphoric acid and 11.2% potash in the 1955-56 fertilizer year. Yet there was a definite trend toward high-nitrogen fertilizers during a year when total mixed fertilizers remained stable.

Mixed fertilizers used in 1955-56 contained 815,000 tons of nitrogen, while straight materials accounted for

1,137,000 tons. This is in contrast with 1,789,000 tons of phosphoric acid and 1,671,000 tons of potash in mixed goods versus 457,000 tons of phosphoric acid and 218,000 tons of potash as straight materials.

Bigger Profits

You sell more plant food at better profit, when you build your leadership among farmers as a dependable source of supply for mixed fertilizers that supply the complete plant food needs of crops.

When you balance your mixed fertilizer with adequate nitrogen to meet crop requirements you also insure the best possible return from the phosphorus and potash present. This means more farmer satisfaction and more repeat business for you.

You can increase the farmer's profit, your dealer's profit and your own profit, by manufacturing and selling complete fertilizers that contain plenty of nitrogen in balance with other plant foods.

More Dollar Volume

By producing higher-nitrogen mixed fertilizers, you can put a greater dollar volume of tonnage through your plant. You also make substantial savings in storing and shipping costs per unit of plant food. These costs are becoming more important with increasing freight rates and the necessity to warehouse more

PLANT FOOD CONTENT OF CROPS

Crop	Yield	Part of Crop	N lbs.	P ₂ O ₅ lbs.	K ₂ O lbs.	Total
COTTON	750 lbs.	lint				
	1,250 lbs.	seed	60	30	20	110
	2,000 lbs.	burrs, leaves and stalks	45	15	45	105
	Total		105	45	65	215
CORN	100 bu.	grain	90	35	25	150
	3 tons	stover	70	25	95	190
	Total		160	60	120	340
WHEAT	40 bu.	grain	50	25	15	90
	1.5 tons	straw	20	5	35	60
	Total		70	30	50	150
OATS	60 bu.	grain	50	20	15	85
	2.0 tons	straw	25	15	80	120
	Total		75	35	95	205

off-season production to meet peak requirements.

One Sale — One Package

You enable your dealer to make better use of his storage and trucking facilities. With high-nitrogen mixed fertilizers, he can haul a higher value pay load and have less storage cost per dollar of inventory. You also help your dealer to supply the farmer with his plant food requirements in a one-sale, one-package deal. This reduces selling cost and minimizes the danger of losing business to a competitor.

Greater Benefits

High-nitrogen mixed fertilizers save the farmer handling and application costs and increase his efficiency. You supply him with plant foods that are chemically hitched and balanced so that he gets greater benefits from everything in his fertilizer. Also, high-nitrogen fertilizers help to take the guesswork out of farming.

It Pays Many Ways

Start now to supply more of your customers' complete plant food needs with mixed fertilizers. Make sure your analyses include plenty of nitrogen. It pays many ways!

How to Put More Nitrogen into Mixed Fertilizers

New ARCADIAN® Nitrogen Solutions now make it easier than ever before to produce high-analysis, high-nitrogen mixed fertilizers in regular equipment.

17% to 30% More Nitrogen

URANA® 6 and NITRANA® 4M Nitrogen Solutions are high in nitrogen and low in free ammonia. These ARCADIAN Solutions, plus sulphate of ammonia, are enabling mixers to put a high-nitrogen content into good quality mixed fertilizers. They decrease the need for nitrogen from other sources.

These Solutions have low vapor pressure. The salting out temperature for URANA 6 is 35°F., just above freezing, and that for NITRANA 4M is 61°F. Now shipped in insulated cars, these Solutions are easy to handle. At the same ammoniation rate as other Solutions, they put 17% to 30% more nitrogen in mixed fertilizers.

It's easy to shift your regular ammoniation methods to the use of URANA 6

	URANA 6	NITRANA 4M
Total Nitrogen	42.0%	41.0%
Anhydrous Ammonia	19.5%	19.0%
Ammonium Nitrate	66.3%	72.5%
Urea	6.0%	—
Water	8.2%	8.5%
Specific Gravity at 60° F.	1.178	1.194
Salting Out	34° F.	61° F.
Vapor Pressure at 104° F.	10 lbs.	7 lbs.

or NITRANA 4M. Get the facts from your Nitrogen Division technical service man. These Solutions make it practical to formulate high-analysis, high-nitrogen fertilizers in almost any plant.

Another Method

Some manufacturers prefer to get a higher nitrogen content by using URANA or NITRANA Nitrogen Solutions high in free ammonia. This can be done by adding sulphuric acid in the mixing process. It amounts to making your own sulphate of ammonia while you are formulating fertilizers.

Take Your Choice

Either of the above-described methods will produce good-quality fertilizers with real economy. The best method for you depends on plant equipment, cost of materials, and the actual ratios you wish to produce. Your Nitrogen Division technical service man can be helpful to you in selecting the method best adapted to your particular needs.

More Mixed Fertilizer Sales

Production of high-nitrogen mixed fertilizers will enable you to supply a bigger share of your customers' total plant food needs with mixed fertilizers. You will be diverting business from straight materials into more profitable mixed fertilizers.

For technical help on the production of high-nitrogen mixed fertilizers in your plant, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. This service is available to customers without charge.



Proper selection of the correct nitrogen solution can help you produce high-nitrogen fertilizers with your regular ammoniating equipment.

HERE'S THE BIG LINE OF

Arcadian

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

**Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer
Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia**

NITROGEN DIVISION

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300



Hopewell, Va., P. O. Drawer 131 Cedar 9-6301
 Ironton, Ohio, P. O. Box 98 Ironton 8-4366
 Omaha 7, Neb., P. O. Box 166 Bellevue 1464
 Raleigh, N. C., 16 W. Martin St. Temple 3-2801

Columbia 1, S. C., 1203 Gervais St. Alpine 3-6676
 Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
 Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
 Columbia, Mo., P. O. Box 188 Gibson 2-4040

Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
 Kalamazoo, Mich., P. O. Box 869 Kalamazoo 5-8676
 St. Paul 4, Minn., 45 N. Snelling Ave. Midway 5-9141
 San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

THE CUSTOM

Applicator

Articles on a new agricultural
airplane and on the job of the
ground spray custom applicator
highlight this first installment
of THE CUSTOM APPLICATOR

MAY 1958



TRIPLE SUPERPHOSPHATE



RUN-OF-PILE

High Porosity
High Water Soluble P_2O_5
Balanced Moisture
Free Acid
Correct Size Distribution



GRANULAR

Uniform Particle Size
Guaranteed 46% A.P.A.
Proper Hardness



COARSE

Honeycomb Structure
High Water Soluble P_2O_5
Controlled Screen Size

Rigid Quality Control assures you of highest quality ROP, COARSE or GRANULAR TRIPLE SUPERPHOSPHATE.

ONE SOURCE FOR ALL THREE—

There's a **BRADLEY & BAKER** office near you. Their representative would be pleased to consult with you on your requirements.

U. S. PHOSPHORIC PRODUCTS

INDIANAPOLIS OFFICE
P. O. Box 55251 • Uptown Station
INDIANAPOLIS 5, INDIANA
Phone: Walnut 3-5477

Area Offices:

Atlanta, Georgia St. Louis, Missouri
Phone: Trinity 6-4393 Phone: Parkview 7-8166
Norfolk, Virginia
Phone: Madison 2-2708

**U.S. PHOSPHORIC
PRODUCTS**
Division
TENNESSEE T.C. CORPORATION

BRADLEY & BAKER

Sales Agents

155 East 44th Street — New York 17, N. Y.
Phone: Murray Hill 2-5325

LETTERS to the EDITOR

Congratulations on AGRICULTURAL CHEMICALS' decision to establish a new section, "The Custom Applicator." It is our experience, too, that the place of the custom applicator in this field is of increasing importance.

Jennings P. Felix
WASHINGTON ASSOCIATION
OF GROUND SPRAYERS
Seattle, Washington

We feel that such a section, dealing with custom application of pesticides will aid both the grower and the applicator. Anything we can do to help, please do not hesitate to call.

Wanda Branstetter
AGRICULTURAL AIRCRAFT
ASSOCIATION
Fresno, California

From our correspondence and wide acquaintanceship with people interested in pest control matters throughout the country, we are convinced that such an addition to your excellent publication will be heartily welcomed, and assure you that we shall be pleased to contribute to its success.

Kenneth Messenger
USDA, PLANT INDUSTRY STA.
Beltsville, Md.

We think that you have a splendid idea in starting a new section on "the custom applicator." There is no question that custom applicators contribute a great deal to the welfare of our farm people. It is important that they be properly educated, and through contact with a publication like AGRICULTURAL CHEMICALS, I am sure that they will be greatly aided.

John V. Osmun
PURDUE UNIVERSITY
Lafayette, Indiana

Thanks for telling us about the new section in your magazine for custom applicators.

I hope that you will include custom weed control, as well as custom applications of insecticides and fungicides. Custom application of weed killers in industrial areas and along right-of-ways has become quite a substantial business.

George H. Soule
E. I. DUPONT DE NEMOURS
Wilmington, Del.

I was interested to learn of your expanded editorial policy.

Regarding the type of material and problems that might be appropriate for this section, you might consider articles on: what the airplane is capable of accomplishing; safety in handling pesticides; new aerial dispensing equipment; and educational articles directed to improved pilot training practices.

Charles Parker
NATL. AVIATION TRADES ASSN.
Washington, D. C.



Certification of the Aerial Applicator Industry

by GALE HANSON

ONE of the most serious problems facing the aerial application industry is that aerial applicators are forced to operate under the terms of a waiver of regulations rather than having a specific set of regulations under which to operate.

The commercial aerial application industry has grown since its organization in 1919 to a multi-million dollar industry. It is one segment of the aviation industry that has never existed on direct or indirect government subsidies. Every gross dollar earned comes the good old fashioned American way, through competitive bidding.

The industry has stabilized, aircraft and pilotwise, to where there are some 1500 operators using approximately 5,000 aircraft flown by around 10,000 pilots. On an annual basis aerial applicators treat nearly 100,000,000 acres with 100,000,000 gallons of liquids and over 800,000,000 lbs. of dry-type chemicals, seed and fertilizers.

The equipment used by this industry continuously improves and becomes more expensive each year. Also the flight personnel are receiving better training and becoming more skilled as each year passes.

Yet for an industry that has done so much good for the nation and has had such a phenomenal growth, it still must operate under one of the worst types of government requirements. This requirement is not a set of regulations like the airlines or the non-scheds have, but a certificate of waiver that waives certain air rules and certification procedures.

One of the worst features of a waiver is that it places a respectable and needed industry of this type in the same class as thrill-a-minute, harem-scarem air shows. Waivers also leave too much up to individual judgment of the government personnel who prepare and enforce them. It is conceivable and often happens that personnel of a hundred different government offices handling waivers on this industry use that many different types of individual judgment as to how an ag operator should operate under the terms of its waiver.

Insurance companies have had a rate-charging field day in their dealings with our industry because of the waiver, under the guise that it is a dangerous business. Yet the ag aviation business is the third safest in the whole aviation industry.

Waiver of regulations so aerial applicators may operate has provided banks with the proverbial "No" to answer an ag aviation operator

(Turn to Page 73)

Grumman Introduces its New "AG-CAT"



THE Grumman Aircraft Engineering Corporation, Bethpage, N. Y., has entered the agricultural aviation field with an aircraft especially designed for application work. The first production model of the "Ag-Cat" will appear this summer, and certification from the Civil Aeronautics Administration is expected at about the same time.

By the spring of 1959, Grumman hopes to be producing four "Ag-Cats" per week. Grumman has been a major supplier of Navy aircraft since 1930 and currently produces a wide variety of military aircraft, including jets. They returned to the commercial aircraft field in 1957 with an executive transport and the "Ag-Cat" is their latest commercial product.

A major feature of the plane is its biplane design that combines maximum wing area with minimum wing span. A survey of crop-dusting accidents has revealed that a high percentage of accidents occur as the result of a stall during the "turn-around". With this in mind, Grumman designed the "Ag-Cat" so that it can execute a continuous 1.5G turn at the dusting speed and at a maximum gross weight. Going back to the Wright brothers' original conception of powered flight, Grumman planned their new crop dusting plane so that the wings, and not the engine,

carry the load. The upper and lower wings are interchangeable and are torsionally stiffened, with a minimum of external wires which greatly reduces rigging time.

The Aviation Division of the United-Heckathorn Co., Richmond, Calif., has contracted to conduct field service trials of the new airplane. Heckathorn was asked to test the craft because its operations cover a wide variety of flight conditions and many types of applications. In addition, Texas A. & M. College, College Sta-

tion, Texas, will be provided with an "Ag-Cat" to conduct the development and testing of the spray and dusting systems. Texas A. & M. has done a great deal of developmental work in the aerial application of pesticides, testing aircraft, spraying and dusting equipment and agricultural chemicals.

Grumman first turned to agricultural aviation in 1956 with detailed studies of the unique flight conditions and problems of aerial applicators. Actual design work on the new plane started in late 1956 and the first flight



was made in May, 1957. The airplane is reported to have exceeded its estimated performance in these preliminary tests, and satisfactory handling characteristics were achieved with very few modifications. A second prototype was finished and flown in July, 1957, by which time the spraying and dusting equipment was ready to be installed and tested.

A preliminary evaluation was held by operators from different sections of the country who had been invited to Bethpage to fly the new plane. Their reactions encouraged the company to fly the two airplanes to the Gulf coast area where over 130 pilots flew and evaluated the "Ag-Cat" in both the empty and loaded conditions.

Further development work on the dispersing system presently is being carried out and improvements are being made as a result of the many suggestions offered by the operators who test-piloted the airplane.

Because a pilot has very little time to check instruments during flight operations, Grumman has situated the airspeed indicator and engine tachometer on a separate panel up forward of the cockpit. This places them almost in line with the pilot's line of vision and makes it unnecessary for him to look inside the cockpit and away from his flight path. Other feature of the "Ag-Cat" are its sloping nose that affords excellent visibil-



ity, a gentle stall at low speeds, a full throat emergency dump valve that empties the hopper in minimum time,

and oversized disc brakes to assure longer wear. The dispersing system features instant change from duster to sprayer.

The "Ag-Cat" was designed to be powered by an engine in the 200 to 300 horsepower class. Although the exact cost of the plane has not been finally established, it is expected to be in the neighborhood of \$18,000. This price, however, can be cut to about \$16,500 if the purchaser furnishes his own engine and propeller for installation. More than half a dozen engines in the plane's class, both flat and radial, are available as new or used.

Grumman has appointed four dealers to handle area sales and service in the United States. They are: Magnolia Aviation Co., Laurel, Miss.; Sun Valley Dusting Co., San Benito, Texas; Mid Continent Aerial Sprayers & Dusters, Inc., Hayti, Mo.; and United-Heckathorn.





CHECKMATE FOR MITES

KELTHANE

Cleared for full-season use

Residue tolerances have been established for KELTHANE that, in general, permit its use throughout the season, as needed for efficient mite control.

This is good news for everyone who has the problem of keeping mite populations at low levels. KELTHANE is the best all-round miticide ever developed. Only KELTHANE gives you all these advantages:

- Fast initial kill
- Long residual activity
- Control of most species
- Safety on crops and to operators when used as directed
- Harmless to beneficial insects

Solve your mite-control problems with KELTHANE . . . fast-acting, long-lasting *checkmate for mites*. Ask your supplier for additional information.



Chemicals for Agriculture

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

KELTHANE is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.



Although a fair number of especially designed agricultural airplanes have begun appearing in recent years, many aerial applicators still tend to continue to purchase surplus Army planes modified to serve as crop dusters. As a result, new planes had trouble getting off the ground in the past. With old planes getting scarcer and more expensive to overhaul, however, Grumman's "Ag-Cat" may be

arriving at an opportune time. Being an established manufacturer of a wide variety of aircraft, Grumman is able to produce a plane that can be sold for less than \$20,000 whereas most of the other specially designed agricultural spraying and dusting planes have had to sell in the range of upwards of \$25,000.

Among aerial application planes introduced during the past few years are the Piper PA-18A, the Transland AG-2, the Larson D-1, and the Fletcher FU-24. Sales on these have been below expectations. Another company, Central Aircraft, Inc., of Seattle, started work on an Air Trac-

tor in 1954 but abandoned the project in 1956 without ever having been granted certification. Since that time they have been trying to find a way of producing the plane economically.

Two English companies, Percival and Auster, have been working on crop dusting planes since 1956. Percival offers the P.9 and Auster the Agricola. Both planes were designed for operations in New Zealand and have not been offered in the United States to any great extent. Auster, however, is now preparing to manufacture a Workmaster that they expect to sell not only in Britain but overseas as well.

AG-CAT FEATURES

Specifications

Wing span	35' 8"
Overall length	24' 4"
Maximum height	10' 9"
Maximum gross weight	3600 lb.
Weight empty	2179 lb.
Fuel	34 gal.
Oil	5 gal.
Hopper volume	29 cu. ft. (217 gal.)
Hopper load restriction	1000 lb.

Performance

Maximum speed (level)	110 mph
Stall speed	42 mph
Take off distance	
@ 2600 lb.	330 ft.
@ 3600 lb.	675 ft.
Rate of climb @ 2600 lb.	240 fpm
@ 3600 lb.	530 fpm
Endurance (220 hp Continental @ 1750 rpm) ..	3 hr.





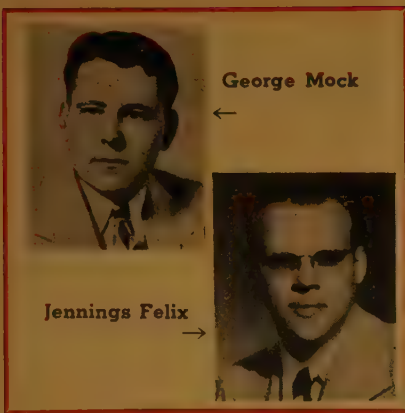
LEADING GROWERS OF MANY CROPS DEPEND ON TOXAPHENE FOR SEASON-LONG
INSECT CONTROL. FOR EXAMPLE, TOXAPHENE IS OFFICIALLY RECOMMENDED
FOR CONTROL OF MORE COTTON INSECTS THAN ANY OTHER INSECTICIDE.

*Agricultural Chemicals Division
Naval Stores Department*
HERCULES POWDER COMPANY
INCORPORATED IN NEW YORK
900 Market Street, Wilmington 99, Del.



NX 86-11

Washington Association of Ground Sprayers



THE application of chemicals to plants for various purposes is not new. However, the wealth of new information and the numbers of new and combinations of old chemicals developed, even discovered, in the past few years have evolved a totally new concept to the industry.

Formerly, a few chemicals, adequate water as a carrier for the chemicals and some sort of equipment with which to apply the material was thought to be adequate. Few realized the involvements. Consequently, much damage was caused by insufficiently trained and otherwise inadequate operators. There were many capable operators in the field, but the poor reputation earned by the inadequate operator tarred all.

As one, upon thought, will realize a competent person in this field must have a working knowledge of some chemistry and the effect of mixing specific chemicals used, the dangers of certain chemicals, the tolerance of humans as well as insect and plant life to the various types of application. Furthermore, insecticides kill insects because they affect a life process such as respiration, digestion, circulation and nerve reaction. The relative toxicity to the insect to be controlled and to animals and humans must be known for safe and correct application. The growth cycles, tolerance susceptibilities of the various insects, plant diseases, virus, fungi, as well as the pathology of the various and extremely numerous plants, shrubs, grasses and crops to which control chemicals are or should be applied must also be known. This, of course, precludes an ill-informed operator from doing adequate control work.

Subsequent to World War II, more and more home owners, perhaps due to better business conditions, became interested in landscaping and taking care of their plants, shrubs, flowers, trees, lawns, etc. Whereas many of them had been good "green thumb" gardeners, they began to discover problems which they could not cope with. Unfortunate accidents had also occurred, because the home owner was not aware of the extreme toxic nature of certain chemicals.

There had been a number of proficient ground chemical applicators in the Seattle area for some years. They usually worked for regular accounts. With the increase of business, the field was invaded with well-meaning and well-intentioned individuals who however were almost completely incompetent.

The established operator looked upon the newcomers with very little enthusiasm. There was enough business for everyone, but because of the normally incompetent newcomer, the reputation of the entire industry suffered. The inexperienced operator sometimes did more damage to the plant he was spraying than to the insects he was attempting to kill. The Washington State Department of Agriculture at about this time had instituted regulatory action as a result of a tremendous destruction of grapes in Eastern Washington caused by spray drift from adjacent areas. Meetings were held out of which came the Washington Association of Ground Sprayers, Inc. The purpose of the Association was not only to deal as a unit with the various governmental bodies; to improve the laws relating to spraying; but primarily to raise spraying standards in the State by education.

When the Association was formed it was learned that many of these newcomers were not even licensed. Prior to obtaining a license to spray in the State of Washington, the applicant must pass a written examination. The test was admittedly poor but it was of some benefit.

Monthly meetings have been held since November 1954, at which the various new developments in the field are presented and discussed. We have joined with the University of Washington, Washington State College and the various Experiment Stations throughout the State in putting on

(Continued on Page 76)

Officers of WAGS

President George Mock

Vice Presidents.....T. A. Ziegler
Robert M. Dye

Secretary-Treasurer
Jennings P. Felix

Board of Directors

Wallace Bartell

John Behey

Russell Faulkner

Stanley Raplee

Frank Scarbery



Thiodan

A Noteworthy New Broad Range Insecticide for Potatoes

Kills'em All!



NIAGARA POTATO FUNGICIDES OF PROVED EFFECTIVENESS

Niagara Nabam

An organic liquid fungicide, compatible with most insecticides. Controls many diseases, particularly early and late blight.

Niacide Z

A new organic potato fungicide containing zinc salts. Niacide Z gives exceptionally good control against early blight.

NIAGARA THIODAN GIVES ONE SHOT CONTROL OVER ALL COMMON POTATO PESTS

Thiodan is a name for potato growers to remember. It is an important new Niagara discovery. Thiodan provides broad range use and sure kill effectiveness against *all* potato insects. With Thiodan you get a multiple kill of several potato pests at the same time. This means new ease and convenience plus economy in protecting your crop.

Thiodan is easy to use. Just mix this concentrate with water at the rate of one quart per 100 gallons. Apply with ground spray equipment. And Thiodan is compatible in your spray tank with all commonly used potato fungicides. So be among the first to benefit from Niagara Thiodan. See your Niagara dealer, Niagara field man or write us.



Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION
Niagara Chemical Division

MIDDLEPORT, N.Y., RICHMOND, CALIF., JACKSONVILLE, FLA., WYOMING, ILL.,
NEW ORLEANS, LA., AYER, MASS., HARLINGEN, TEXAS, YAKIMA, WASH.,
SHEKUNVILLE, MISS.
Canadian Associate: NIAGARA BRAND CHEMICALS, LTD., BURLINGTON, ONT.

Jennings Felix - executive secretary of the WASHINGTON ASSOCIATION OF GROUND SPRAYERS discusses specific questions on custom application

1. What Spray Services Does The Custom Applicator Offer?

Spraying is used to control slugs, insects, plant diseases, weeds, brush, moss and other noxious or unwanted plant growth and insect life. There are soil sterilants to kill all vegetation in an area as well as fertilizer for plant growth.

A. YEAR AROUND SPRAY MAINTENANCE: Practically all reputable members of the industry do spraying on a year around maintenance basis. Costs vary, depending upon the size of the area to be sprayed, the number of different types of plants and the variety and concentration of insect infestation. Costs are usually based on gallonage.

B. SINGLE VISIT, SEASONAL CLEAN-UP SPRAY: One visit per year would, of course, effect some control but normally it would be inadequate. The life cycle of many insects is measured in days.

2. What Is The Ideal Spray Program For The Ordinary Suburban Or Town Lot Under A Quarter Of An Acre?

The ideal spray program consists of four general sprays per year, one each season, plus two sprays for peach trees and for weed control. There should also be two fertilization jobs and one application of a moss control.

3. What Are The Most Common Pests Which Operators Are Called Upon To Control?

There are so many pests that many persons have probably never heard of those which could be termed "common." The problem is that most home owners and indeed even many nurserymen, do not recognize the myriad forms of insect life which surround them. Scientists estimate there are between 625,000 and 1.5 million different kinds of insects. Two-fifths of all known kinds of insects are beetles. Moths, butterflies, ants, bees, wasps and true flies comprise another two-fifths. A few of the more common Northwest insects are:

aphids (28 varieties)	oyster shell scale
mites (7 varieties)	San Jose scale
caterpillars	lecanium
weevils	dozen pine scales
slugs	mealy bugs
thrips	woolly aphids
leaf hoppers	soft brown or camelia scale
spiders	holly leaf miners
leaf miners	holly bud moths
scylla	cyprus tip borers
earwigs	tussock moths
sod web worms	all beetles
spruce galls	

4. What Specific Spray Materials Are Used For Control?

Chemical spray materials are divided into many categories, the most common of which is based on the mode of action of the chemical. The primary chemicals used

to control the above insect pests are contact poisons, stomach poisons, fumigants, acaricides, nematocides, larvicides, aphicides, etc. Five types of insecticide formulations are used to control insects; dusts, wettable powders, emulsions, solutions and aerosols are classifications based upon manner of application.

5. If A Complete Program Is Followed For One Year, Will It Be Necessary To Cover The Garden As Thoroughly The Next Year?

This depends upon the insect infestation involved. The usual answer, however, is "Yes."

6. Is Neighborhood Or Group Hiring Less Expensive?

Neighborhood or group hiring has not yet been practiced extensively. Charges based upon gallonage cannot be too much lessened by the mere addition of customers. The operator can reduce costs, however, by the elimination of time to and from the job as an unproductive cost factor. Thus, if a number of neighboring individuals all desire to have their spraying done at the same time, this will result in less expense to them and to the operator, so long as all of them require the same type of spraying to be done.

7. What Is The Advantage To The Home Owner In Using A Custom Applicator Service Rather Than Doing The Work Himself?

The most important advantage is that by using a competent sprayer he obtains specific control for the job required. He may be unable to obtain the most effective chemicals. Few home owners have the chemical, botanical and insect knowledge required. Home owners annually spend millions on the patent medicines of the insecticide world, often seriously harming the very plant they desire to protect. *Professional results are seldom obtained by amateur efforts.*

8. Does The Custom Applicator Service Farmers?

The answer is "yes" particularly in the smaller towns and other urban areas. Included in the definition of "farms" are orchards. The large orchards are usually covered by custom applicators specializing in that field. Many farmers themselves do custom application.

9. From Whom Does He Buy His Chemicals?

The custom applicator in Washington buys his chemicals from distributors and formulators. There is now a definite effort being made to pool purchases and buy directly from the formulator.

10. Does The Custom Applicator Do Any Of His Own Formulation Mixing, Etc.?

The answer is very definitely "yes." A great deal of personal formulation is done.★★

THINK FIRST OF **Diamond Chemicals**

*for dependable
Insecticides
and Herbicides*



Technicals and Formulations

Insecticides

DIAMOND dependable insecticides have long been favored because of their uniform high quality. DDT, BHC and Lindane Technicals are supplied in many types and forms.

Insecticides for Formulators and Producers

DDT—100% Technical
DDT—Wettable Powders
DDT—Dust Concentrates and Emulsions

Lindane—Emulsions, Wettable Powders, Dusts
Lindane—100% Gamma Isomer of BHC
BHC—40% Technical

BHC—14-15% Technical
BHC—12% Wettable Powders and Dusts
BHC—Emulsion Concentrates
K-101—Miticide

Weed Killers and Brush Control Chemicals

DIAMOND weed and brush killers, based on the 2,4-D and 2,4-T chemical groups, meet every weed and brush control problem.

These dependable DIAMOND herbicides are pro-

duced in two forms: *Technical* for use by formulators and processors in their own formulations and *ready-to-use formulations* for farmers, ranchers, country clubs and homeowners.

Technicals for Formulators

WEED KILLERS

2,4-D Acid • Technical Butyl-D
Technical Isopropyl-D
Technical 2-Ethyl Hexyl (Iso-Octyl)-D (Low Volatile)
Technical BEP-D (Low Volatile)

BRUSH CONTROL

Technical Butyl-T • Technical Isopropyl-T
Technical BEP-T (Low Volatile)
Technical 2-Ethyl Hexyl (Iso-Octyl)-T (Low Volatile)

Ready-To-Use Formulations

WEED KILLERS

*4# Mixed Amine-D • 4# Dimethylamine-D
2.67# Butyl-D • 4# Butyl-D • 6# Butyl-D
4# 2-Ethyl Hexyl (Iso-Octyl)-D (Low Volatile)
4# BEP-D (Low Volatile) • 3.34# Isopropyl-D

Also special formulations designed to meet specific weed and brush control problems of railroads, electric power and pipe line rights of way, highways and parks.

BRUSH CONTROL

*4# Butyl-T • 4# BEP-T (Low Volatile)
4# 2-Ethyl Hexyl (Iso-Octyl)-T (Low Volatile)
2,4-D—2,4,5-T Mixtures • 2#—2# Butyl Brush Killer
2#—2# 2-Ethyl Hexyl Brush Killer (Low Volatile)
2#—2# BEP Brush Killer (Low Volatile)

*Numbers are pounds of 2,4,5-T or 2,4-D acid equivalent per gallon.

DIAMOND research is constantly seeking new and better insecticides and herbicides and working with formulators and agricultural chemists in the development of more efficient forms and application methods. We will be glad to work with you. For information on DIAMOND Chemicals and technical

co-operation write, DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.



Diamond Chemicals

PEST ROUNDUP

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Plant Pest Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward



Cotton Boll Weevil Survival Counts Down

SURFACE woods trash examinations to determine the number of boll weevils surviving the winter have been completed in Louisiana, Mississippi, Georgia, North & South Carolina and Virginia. In all cases the number of surviving weevils was markedly reduced from the number found entering hibernation last fall. The three Parishes—East Carroll, Madison and Tensas—comprising the northeast Louisiana area showed an average survival count of 1,480 weevils per acre. This gave a winter survival rate of 18 percent of the 8,043 weevils per acre found in hibernation last fall. Although the winter survival is much lower than in 1956, the population is not much lower due to the heavy fall population.

The percentage survival of the boll weevil in the areas studied in Mississippi was the lowest since records have been maintained. In the lower delta area 418 weevils were found surviving, while 5,243 were found in hibernation last fall; in the central delta 551 and 6,269; the north delta 381 and 11,264; and the hill section 219 and 4,087.

The average percent of cotton boll weevils found surviving the winter in the areas surveyed in Georgia was 34 percent. In the northwest section of Georgia, 97 surviving weevils per acre of woods trash were found; north central, 307; east central 968 and in the south 532 giving an average of 731 live weevils per acre for the four areas. The count for the number of weevils per acre found in

hibernation during the 1957 fall survey in Georgia was 2,081.

The percentage reductions in the Carolinas-Virginia counts were very high. Boll weevil survival counts in the south central area of South Carolina were 457 while 3,978 were found in the fall hibernation survey; thus giving a 11.5 percent survival. In the Coastal Plains area of North and South Carolina, survival was 403 weevils per acre with 11,374 fall hibernation for a survival of 3.5 percent. In the Piedmont area of North and South Carolina, the survival was 296 against 6,752 found in fall hibernation for 4.4 percent. The figures for north central North Carolina were 54 weevils surviving as against 2,205 in the fall hibernation survey or 2.4 percent. Southeastern Virginia survival counts were 54 weevils per acre compared with 3,335 last fall in hibernation or 1.6 survival.

In the Florence County, South Carolina area an average of 538 weevils per acre were found surviving. Compared with the 7,693 found in the fall hibernation survey, the percent survival was 6.9. Records have been maintained in Florence County since 1938. In only one year has the number of surviving weevils been fewer than found in the spring of 1958. In the 1940 survival survey, 176 weevils per acre were found.

Greenbug Heavy in Some Areas

ALTHOUGH light in most areas, spotted heavy populations of the greenbug were reported from several

sections during late March and early April. In Texas, infestations on small grains were spotted heavy through the North Central area of the State, medium to heavy in Brazos and Bowie Counties, and light to heavy in other central eastern counties where the stand was killed in some fields.

Oklahoma reported counts up to 150 greenbugs per linear foot of wheat in scattered fields in the Hennessey area of Kingfisher County. Considerable spraying had been done. Light counts were reported from the majority of the fields in the south central Oklahoma Counties, but populations up to 500 per linear foot were reported from Cleveland County, 250 in Carter County and 300 in Love County. Light damage was noted in a few fields but both lady beetles and fungus were found active on the aphid in some areas. No greenbug activity was found in Kansas. Activity was light in New Mexico. Populations of 10-15 per 10 sweeps were found in fields of oats, wheat and vetch in Lee, Macon and Russell Counties, Alabama. Light populations were also reported from three Louisiana Parishes.

Beet Leafhopper Potentials For Southern Great Plains High

THE survey to determine the overwintering populations of the beet leafhopper in the spring breeding area was conducted in late February and early March 1958. The beet leafhopper is the carrier of the virus that causes wilt or curley top in beets, tomatoes and other crops. Hoppers from the area surveyed can affect crops in eastern New Mexico, western Texas, western Kansas, and eastern Colorado.

The survey showed the overwintering adults of this insect and its host plants to be more abundant and widespread than in any of the past 5 years. Current indications are that the number of spring-generation leafhoppers that will move from the spring breeding areas of the Edwards Plateau and adjacent plains area of Texas into cultivated districts of eastern New Mexico, the South Plains and Panhandle of Texas and the Arkansas

River Valley of Kansas, and Colorado will be the largest since the study was started in 1954. The final outcome will depend on weather conditions.

Potato Psyllid Survey Indicates Potential Outbreak

SURVEYS to determine the potential population of the potato psyllid in the southern overwintering areas were conducted during late March 1958. The potato psyllid is of economic importance in that it causes a

The beet leafhopper prefers sunny dry weather. Stormy wet weather could reduce the population, should it occur at the time of hatching.

serious condition in potatoes and tomatoes known as psyllid yellows.

The Texas-New Mexico area overwintering survey furnishes information to the territory northward, particularly Colorado and Nebraska. Growers in Arizona and California as well as those in Nevada, Utah and western Colorado benefit from the Arizona-California survey. The host plant lycium or matrimony vine is swept with a net to determine the population present. Development of lycium varied with condition of the plant, — being fair to excellent. Eggs were found in the Big Spring-San Angelo, Texas area, indicating emergence was not complete. Potential population for 1958 is greater than in 1957 because of abundance of the host and a potential outbreak is indicated for the 1958 season.★★

Thimet With Seed Treatments

Extensive trials during the past year indicate that the use of organic seed protectants with the systemic insecticide Thimet minimizes some "stand" difficulties which heretofore have been attributed to the insecticide in seed treatment, according to the American Cyanamid Co., New York.

These findings indicate that the probable cause of stand difficulties is soil-borne seed decay fungi, the company said. Greenhouse tests conducted on cotton showed that the combination applied to Acala 4-42 cottonseed gave much better stands in the presence of various soil fungi when compared to stands obtained with some mercury fungicide seed treatments plus the insecticide.

Captan-Thimet mixtures were used commercially on cotton in North Carolina in 1957 and in 1958 the majority of cottonseed being treated in California is with this combination. The usual rate of application is one to one and one-half ounces of actual captan per 100 pounds of cottonseed.



KOLKER METHYL BROMIDE

Now being produced at our modern plant in Newark, N.J., Kolker Methyl Bromide is the outstanding fumigant for the elimination of insect and rodent infestation of grain, tobacco plant beds, seeds, dried fruits, cereals, nursery stock and a wide variety of other products.

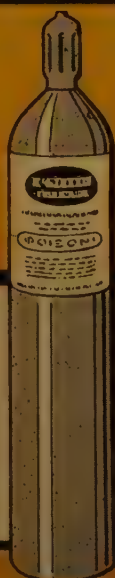
KOLKER METHYL BROMIDE

- Kills insects, mites and related pests in all stages of their development.
- Has a high degree of toxicity to a wide range of insects, rodents and other pests.
- Has rapid volatilization and a high rate of diffusion into stored grain, bales, packages and soil.
- Is non-explosive and non-flammable.
- Does not leave any residual odors, tastes or stains.
- Is economical to use.

KOLKER Methyl Bromide is packaged in one-pound cans, packed 24 per case for domestic shipment and 48 per case for export. It is also available in cylinders of 50, 100, 150 and 450 pounds net capacity.

KOLKER Methyl Bromide may be ordered as a 100% product or with 2% chloropicrin warning agent.

For further information on this highly effective fumigant, please call or write us today.



KOLKER

CHEMICAL CORPORATION

600 Doremus Ave. • Newark 5, N. J. • Market 2-4085

A report from General Chemical on

2 NEW WEED KILLERS

for non-crop use

UROX®

WEED KILLER

Urox is an entirely new chemical herbicide in granular form, developed by General Chemical Division Research. Field tested on a wide range of annual and perennial grasses and broad-leaved weeds, it has given outstanding control for as long as 12 months. This means that under average growing conditions, unwanted vegetation can be virtually wiped out for a full season without the use of excessive amounts of herbicide. Furthermore, because the effects of Urox are cumulative, herbicidal action can be continued year after year by applying very small "booster" doses annually.

Weed Control With Urox Costs Less

1. Because applications are made only once a year under normal growing conditions.
2. Because long range weed control is achieved with small amounts of Urox.
3. Because Urox can be applied without using expensive equipment.

Granulation Gives Penetration

No water is required for Urox applications. The herbicide is used without dilution in its granulated form. Aside from making weed treatment easier, the use of Urox granules is responsible for its tremendous success in controlling dense vegetation. When these potent grains of herbicide hit heavy top growth, they simply roll off the foliage to the ground where the killing ingredients are absorbed by the roots.

Urox is Safer to Use

It is non-flammable when used as directed . . . especially important on tank farms and other areas where combustibles are stored.

Low toxicity to animals is another reason why Urox is preferred as a herbicide.



Dramatic demonstration of HCA's effectiveness—a single application on test area gave season-long control of Johnson grass.

HCA WEED KILLERS

*for fast, easy control
of Johnson Grass and other
weeds in non-crop areas*

"Hard-to-kill" Johnson Grass and other grassy weeds in non-crop areas are now easy to kill—with HCA Weed Killers. HCA is the trade name for Hexachloroacetone, a highly potent non-selective herbicide for non-crop areas. Recently developed by General Chemical, these wonderful new weed killers have proved all over the country that they give fast and easy control of Johnson Grass.

Immediate Results

HCA "kills back" top growth in from 12 to 48 hours after spraying. Weeds start to wilt within 3 hours. Com-

pleteness of coverage can be checked before leaving area.

When used as directed, the first application of HCA kills all surface growth . . . kills up to 90% of root growth!

How HCA Works

HCA does this big job by "teaming up" with ordinary weed oils. It gives a terrific increase in weed oil effectiveness while, at the same time, it kills roots and prevents growth.

Easy to Use, Economical

HCA comes in two forms, both low in cost and easy to apply. *HCA Weed Killer Concentrate*—gives excellent results with any low aromatic oil. *HCA Weed Killer*—a ready-to-use spray product.

**MAIL COUPON FOR FREE,
INFORMATIVE FOLDERS**

Weed Killer Department

GENERAL CHEMICAL DIVISION

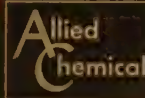
40 Rector Street, New York 6, N.Y.

Please send a copy of your free booklets on ☐ UROX Weed Killers ☐ HCA Weed Killers

Name _____

Address _____

City _____ State _____



AG-58

FOR BETTER PESTICIDES, SPECIFY

Penola HAN

HEAVY AROMATIC NAPHTHA

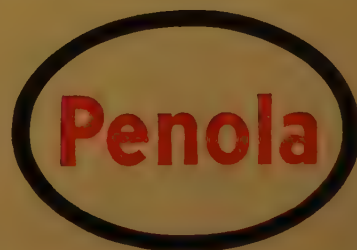


Here's why Penola HAN heavy aromatic naphtha should be used in your pesticides:

It is . . . ● LOW in cost ● HIGH in solvency ● BLENDS readily with active ingredients.

It has . . . ● MILD odor ● LIGHT color ● HIGH volatility, insuring low plant toxicity ● BETTER consumer acceptance.

Use Penola HAN for top quality herbicides, too. Penola HAN is marketed by the Penola Oil Company, distributor of Flit — the greatest name in insecticides. For information on how Penola HAN can improve *your* product, call us today.



Penola Oil Company

NEW YORK • DETROIT • CHICAGO

AGRICULTURAL CHEMICALS

Southeastern Liquid Fertilizer Co. Offers Custom Applicator Service



by A. H. Waters
Vice President of Selfco
Albany, Ga.

IT probably will be well for me to mention that we have been in the insecticide (agricultural chemical) and farm sprayer business, after a manner of speaking, since the early formation of "Selfco", 1949 (Southeastern Liquid Fertilizer Company, Albany, Ga.) Initially, our efforts were exerted toward the direct sales of chemicals to the farm market, with little emphasis being placed upon custom application service which utilized tractor mounted row crop sprayers for control of cotton insects only.

During the spring of 1956 we realized that we were not taking full advantage of the opportunity which our area afforded,—to offer a really good custom spray service,—one equipped and organized to provide superior insect control and defoliation in cotton, insect control in truck crops, as well as insect control and sucker control in tobacco. It was at this time that our association with Stauffer Chemical Co. developed. We also became distributors for Hahn Manufacturing Co. of Evansville, Indiana.

Naturally, our custom program did not grow very rapidly during the spring and summer of '56, but we did gain considerable experience during this season (1957 season) and, most of all, we developed confidence in the fact that our custom program was a sound one—both for Selfco and the farmer who utilized the program. The results that were achieved through the use of the program were far better than we anticipated—it proved to be quite profitable to the customers in

terms of increased crop yields, and to "Selfco" in terms of better utilization of manpower as well as profit. During this period we purchased four Hahn Hi-Boys (High clearance self-propelled sprayers) through which we applied Stauffer chemicals exclusively.

During the spring and summer of '57 we expanded our custom program to include approximately twenty Hahn Hi-Boys which were operated from Selfco plants in the cotton and tobacco belts. In areas in which we did not operate we had an additional 10-15 independent custom operators who serviced their individual areas.

New British Plane For Crop Spraying

A TWO-SEATER agricultural aircraft designed for crop spraying at speeds up to 90 miles per hour was announced in London in March. The first of these aircraft is now being flight tested and is scheduled to begin operations this summer.

Called the Auster Workmaster, it has been designed to the specifications of a crop spraying concern, Crop Culture Ltd., of the Isle of Wight. This firm has ordered nine, and further orders have been received from overseas.

The new aircraft, while based on the standard Auster design, has a 180 h.p. Lycoming engine driving a variable pitch airscrew, and is designed to carry 100 gallons of spray chemical. It has a wing span of 36 feet, and is 23 feet 7 inches long. In order to add to the pilot's protection, the spray tank has been placed along side the pilot's seat, and the load can be jettisoned in five seconds. The pilot's seat has been strengthened and the

As far as we are concerned, this custom spray program will continue to grow and at this time we consider it a major phase of our business.

We do not feel that we have accomplished a miracle, but that we have approached the problem in a logical manner. We attribute the success of the program to the fact that we:

1. Use the best chemicals available and apply them at the specified rates.
2. Use sufficient water to get complete coverage.
3. Urge the customer to institute a program and spray at proper intervals — 5-7 days.
4. Use the best spray equipment available.
5. Are conscientious and do the job correctly.

We feel that we are being completely honest in stating that our customers are producing from $\frac{1}{4}$ to $\frac{1}{2}$ bale of cotton more per acre by utilizing this program than they were previously; they are producing better quality and higher yields of tobacco, truck crops, etc.

windshield has been thickened. The Crop Culture aircraft will have wing tip atomizers made by an associate company, Britten Norman Ltd.

The price in Britain, including spraying equipment, is under £5,000 (\$14,500).

"The performance of this aircraft is so good that we are looking forward to an increase in demand not only in Britain but overseas. The delivery time is now from 12 to 14 weeks," a spokesman for Auster says. A spokesman for Crop Culture says that his company drew up the specifications for the aircraft based on experience gained in Britain, the Sudan and the Cameroons, where in the last six months of 1957 they sprayed over a quarter million acres — 70,000 acres during the peak month.

The new aircraft, he said, can take off fully loaded in 170 yards.

The Auster company is reported to be considering a modified version for other than agricultural purposes.



LET'S TALK ABOUT

Standard AGRICULTURAL *Chemicals*

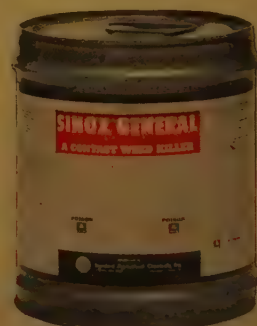
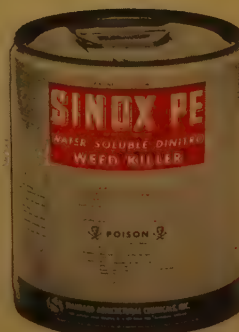
We are a progressive and well-known
producer of proven agricultural chemicals.

The "Standard" line is backed
by experience, research, and field operations.

Our SINOX PE and SINOX GENERAL and other
outstanding agricultural chemical contributions to farm
economics are pleasing growers in all areas.

Join us, and enjoy the extraordinary
performance and profit-making
features of "Standard" agricultural chemicals —
and our full cooperation in their use.

STANDARD AGRICULTURAL CHEMICALS
INCORPORATED



1301 JEFFERSON STREET, HOBOKEN, N. J. • 429 FORUM BUILDING, SACRAMENTO, CALIF.

Meter Controls Aerial Application Rates

AGRICULTURAL engineers at the Ohio Agricultural Experiment Station, Columbus, have developed a metering device to reduce variations in aerial application rates.

The device consists of a fluted drum in the bottom of the hopper which feeds out the material as it rotates. The flutes have flexible rubber edges to prevent particles from being ground up and to make a tight seal when the rotor is stopped. A finger-like attachment was placed over the outlet to prevent pulsating flow.

When granular fertilizer is used, the flow rate can be varied from about 75 to over 1200 pounds per minute by changing the speed of the rotor. In this way, application rates of from 12 to 200 pounds of fertilizer per acre are possible if a 40-foot swath spacing is used.

A hydraulic drive system was developed to use with the metering device. It consists of a hydraulic pump and motor and a flow control valve which controls the motor speed by directing the excess fluid back to the reservoir.

A standard ram air, or Venturi type, the distributor's main function is to give the material being applied enough speed and right direction to produce the desired swath width and distribution pattern.

According to the Ohio Experiment Station, the use of ram air for spreading material has a short-coming. As the application rate is increased, the amount of energy available to accelerate the material decreases. This is because the amount of air flowing through the distributor is reduced by the additional drag of the material. Wind tunnel studies showed that when one goes from no constriction at the throat to a moderate one, there is little difference in the velocity of wheat at the distributor outlet. But when the cross-sectional area of the throat was reduced to half of the inlet or less, the velocity of the wheat leaving the outlet decreased considerably.

Flight tests were conducted by the station with a test distributor hav-

ing detachable straight sections immediately behind the chute, detachable deflecting vanes of several radii, and removable straight extensions outboard of the deflecting vanes. The performance of various combinations of these attachments was tested for swath width and airflow. In general the distributor with the shorter straight section, larger radius deflecting vanes, and longer outboard extensions produced wider swaths. When heavy materials, such as granular fertilizer, were applied the use of the shorter straight section produced the greatest increase in swath width. When light materials, such as granular insecticide, were used, the outboard extensions appeared to be most important.

A complete distributor was built by the Ohio agricultural engineers to check information obtained from previous studies and to obtain more information on factors affecting the distribution pattern. The results indicate that when applying granular fertilizer at 100 pounds per acre, the effective swath width is about 50 feet. The swath width is about 45 feet when applying granular clay insecticide at 20 pounds per acre. Granular insecticides were also applied with the metering device with promising results.

GUEST EDITORIAL

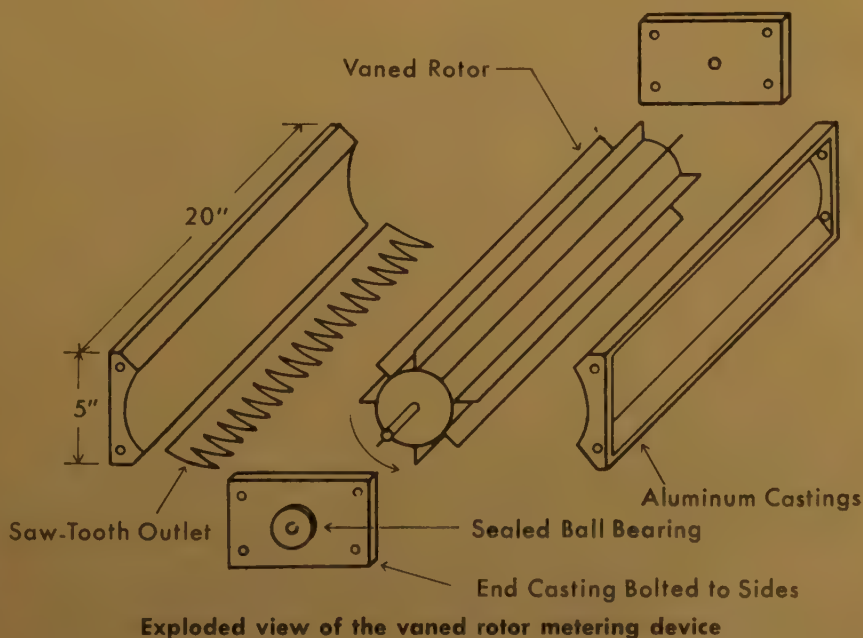
(From Page 57)

when he requests a loan to expand and further his business. Yet ag aviation is one of the most needed industries to provide our nation with a sound agricultural economy.

Such absence of standard regulation, and non-uniform application of the principles and terms of waivers, has forced the aerial application industry to take nationwide drastic action to cure this situation.

In 1956 the ag operators throughout the nation received a study guide of proposed regulation on their industry from CAA. This proposal since then has been torn apart and put together several times by state and national aerial applicator associations, such as Texas, California, Montana, Louisiana National Aviation Trades Association, etc. The proposed regulation has finally been prepared and sent to the CAB for consideration.

It is felt very strongly by the agricultural aviation industry that if the proposed uniform regulation is put into effect it will: Increase the stature and respect this industry deserves, be of great assistance relative to legal claims, afford the industry a positive position rather than a negative approach to problems through the waiver, and assist the industry in financial matters.★★



United-Heckathorn chemical manufacturing and application facilities in key agricultural areas provide first complete local service



• Richmond

• Soledad

• Lemoore

United-Heckathorn permanent or portable plants manufacture insecticides, fertilizers, weed killers, fungicides and fumigants on location and offer aerial or ground application service. The portable plants may be transported to your job site. Both types are scale versions of United-Heckathorn main Richmond, Calif., plant with its research, development and control laboratories . . . vast facilities for mixing, grinding, blending of dry materials and liquids for bulk sales, custom processing, private label packaging . . . engineering for construction and maintenance of specialized processing and application equipment. United-Heckathorn, Richmond or any of the affiliated plants are at your service and invite your call.

UNITED Heckathorn

• Corona

• El Centro



Portable plant compounding chemicals for aerial spraying of beet leaf hopper on 250,000 acres of Kettleman Hills, Calif.



Main Laboratory, Richmond. Chemists, machinists and other technical supervisory personnel accompany field jobs.



Extensive ground application work and chemical sales at Soledad, Calif. in the center of the "Salad Bowl" Salinas Valley.



Packaging and delivery for sales of agricultural chemicals for citrus crops, Corona, Calif.



Formulation and application, aerial and ground, in Imperial Valley, the world's largest vegetable growing center.



Formulation of dry & liquid insecticides for San Joaquin Valley, Lemoore plant near Fresno, center of cotton, potato & grape areas.

UNITED-HECKATHORN

Main office and plant: 600 S. Fourth Street, Richmond 4, Calif.

Phone: LANDscape 5-9210

Plants at Soledad, Corona, El Centro, Lemoore



Natural Resources Building, on the University of Illinois campus. The main offices and laboratories of the Illinois Natural History Survey occupy most of the west (left) end of the building.

Illinois NATURAL HISTORY SURVEY Centennial

HAVING played an active part in the many advances in entomological and biological science, — and at the same time recognizing the increased demands on future research, — the Illinois Natural History Survey this year pays tribute to its economic entomologists by observing the 100th year since the founding of the Society. Studies conducted by researchers at the Illinois Natural History Survey have resulted in very notable contributions to the field of practical entomology, including: (1) practical recommendations for the control of the European corn borer in canning and field corn; (2) statistically significant data on increased production of meat and milk, following the control of tabanid flies, (3) development of a treadle-type sprayer, by means of which cattle can spray themselves. Survey entomologists were first also, in recommending many of the new insecticides, such as chlordane for control of grasshoppers, and others of the chlorinated hydrocarbons for the control of armyworms, chinch bugs, squash bugs, and the carrot weevil.

Through the past hundred years, staff members of the National History Survey and its parent agencies have made notable contributions to biological research, especially that relating to the renewable natural resources of the state. Pioneer research by staff members was done on populations and food habits of fish and birds, animal ecology, ecology of the Illinois

River, stunting of fish in lakes and ponds; life history, classification, and control of certain insects; resistance of insects to chemicals; and control of important plant diseases. Staff-written reports on some of these subjects stand as landmarks in scientific literature.

Illinois created the office of state entomologist in 1867, as a result of requirements and demands of its early settlers, as they coped with the ever-present problem of pest control on crops, livestock, and in homes. A state research agency, the Illinois State Natural Society, had been founded in 1858, and was taken over by the State Laboratory of Natural History some twenty years later. The State Laboratory and State Entomologist's office were united in 1917 to form the present Natural History Survey Division of the State Department of Registration and Education, with

principal offices and laboratories in Urbana, Illinois.

Observing the centennial of its founding, the Illinois Natural History Survey will issue, later this year, an extensive report on its first hundred years of research. Written by Dr. Harlow B. Mills, chief of the agency, and heads of sections, the report will bring together many aspects of research of the past century.

As previously indicated, original demands on the office of State Entomologist, and the State Laboratory were of a practical nature . . . requiring immediate control measures for immediate pest problems. The majority of the investigations, naturally had been directed toward these more practical goals, applying pesticidal chemicals with equipment available. However, as insects develop a tolerance to new toxicants . . . and as they ad-

Machine sprayer designed in the summer of 1897 by the Illinois State Entomologist and used in applying a whale-oil soap solution against the San Jose scale in the fall of 1897 and spring of 1898. The apparatus, mounted in a two-horse station wagon, consisted of a gasoline engine, triplex pump, and double tank with gasoline heaters beneath for heating solution.



just to changing environment and conditions, it is inevitable that the practical control of pests will lie in the knowledge of insects and insect problems found only in basic research. One entomologist cites this period as a turning point in entomology, in which more intensive studies will be required in genetics, biology and ecology.

The "emergency nature" of entomology has to some extent subsided. That is, farmers have been using practical pest control measures for a number of critical crop pests, . . . and can therefore apply these control practices while greater emphasis is placed on basic studies. Illinois entomologists expect to participate in the development and progress of entomology . . . contributing, as it has in the past, the best in scientific achievement.

Trailer Sprayer Combination

A new trailer sprayer combination is offered by F. E. Myers & Bro. Co., Ashland, Ohio, featuring a heavy duty trailer and versatile boom. The trailer may be used with one, two or three 55 gallon drums. When fitted with 6:70-15 tires, the trailer has a ground clearance of about 30 inches. Tread width can be varied from 60 to 80 inches.

Aerial Applicator's Job Log

Monsanto Chemical Co., St. Louis, offers aerial applicators a Job Log and Chemical Safety File Folder. The job file folder lists ten basic rules for safe handling of parathion and methyl parathion. First aid treatment directions are listed on back of the cover.

Space for listing typical job performance data is allowed including: load data, premix data, weather and time of application, etc.



Aerial Fertilization in Va.

Fertilizer is being applied by air-plane in Tazewell County, southwest Virginia, on an experimental basis. The experiment was planned by the Extension Service in cooperation with other agricultural agencies in the area.

High analysis, mixed fertilizer, such as 0-40-20, made with TVA calcium metaphosphate, is used in the experiment. It is hoped that the use of such high analysis materials will make this method of application economical.

Fifty tons have thus far been applied. It is planned to use a total of 2,000 tons in the experiment. Several other Tennessee Valley counties in southwest Virginia are making plans for similar demonstrations.

Spreading fertilizer by plane was first tried in the Valley earlier in the year on a limited scale in Washington County, Virginia. In that initial test, a single wing light plane was equipped with a hopper mounted behind the pilot. At the bottom, a fan type spreader was mounted on the underside of the hopper with the opening control in the cockpit of the plane. This was opened at the approach to the field and the fertilizer drifted out. The pilot flew about 20 feet above the ground. Owing to an unfavorable wind, the pilot carried only 300 pounds of fertilizer. It is believed that 900 pounds is a minimum that can be carried to make the venture feasible from an economic viewpoint, and then only if the fertilizer used is of high analysis.

Corn Borer Damage High

The European corn borer in 1957 destroyed almost 181 million bushels of corn grown for grain, worth \$158,841,000, according to estimates compiled by the U.S. Department of Agriculture.

This loss amounts to about six per cent of the total national grain-corn crop, estimated at more than three billion bushels. It is almost 85 per cent higher than the 98 million bushel loss charged up to the insect in 1956 and is the third highest loss in the past nine years.

The estimates are made in 21 states where the major part of the

nation's grain corn is grown. Corn in Iowa, Nebraska, Missouri, South Dakota, and Illinois suffered most from borer damage.

Florida Spraymen's Assn.

The Horticultural Spraymen's Association of Florida has received a charter after several organizational meetings in Miami, Fla. The association expects to become state-wide, however, with chapters in other cities.

Ted Kaplan, King Spray Service, Miami, has been named president of the group and Richard Zaun, Lake Lois Jean Nursery, Miami, is vice president. The association secretary is William McAllister, Miami Lawn Service, Miami, and treasurer is Charlie P. Johnson, Charlie P. Johnson Nursery & Spray Service, Miami.

Fruit Spray Guide

A new guide, "Fruit Sprays for New Mexico" has been issued by the extension service, New Mexico A&M College, to assist orchardists with pest control.

W.A.G.S. REVIEW

(From Page 65)

schools, covering this field. These are open to all persons interested. The program of our last short course was as follows:

1. Laws and Regulations on Ground Spraying — Norris
2. Insects of Ornamentals and Small Fruits — Breakey
3. Safety of Pesticides — Upholt
4. The Miller Bill — Telford
5. Insects Attacking Vegetables—Eide
6. Diseases of Ornamentals—Harris
7. Diseases of Tree Fruits — Johnson
8. Fertilizers and Soil Conditions — Mortenson
9. Control of Slugs and Snails and Forage Insects — Howitt
10. Herbicides — Wolfe
11. Literature Guides to Insect Control — Brannon

Following the school, the State Department of Agriculture gave the new test which had been developed primarily by the State College. The Association underwrote the expense.

Furthermore, the Association "certifies" those of its members who are licensed, adequately insured, and who pass certain qualifications relative to ability and equipment. Thus, a "certified sprayer" is vouched for by his competitors.

LISTENING POST

By Paul Miller



This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Mycology and Plant Disease Reporting Section, Plant Protection Research Branch, United States Department of Agriculture, Beltsville, Maryland.

Combination Seed Treatments of Cucurbit

J. J. NATTI, W. T. Schroeder, G. E. R. Hervey, and F. L. McEwen, of the New York State Agricultural Experiment Station, Geneva, New York, write that treatment of cucurbit seed with a combination of insecticide and fungicide for protection against the seed-corn maggot and seed rotting fungi is being used increasingly in New York. They report results of field tests comparing fungicides alone and in combination with insecticides, used on seeds of National Pickling cucumber and Blue Hubbard winter squash, to determine the value of the combination treatments under New York conditions.

METHODS: The treatments used were laboratory preparations of the fungicides captan (Orthocide 75) or thiram (Arasan SF), alone and combined with each of the insecticides dieldrin (75% w.p.), heptachlor (75% w.p.), or lindane (75% w.p.), and the commercial preparations Delsan A-D (thiram plus dieldrin), Ortho Seed Guard (captan plus lindane), and GLF Combination Seed Treatment #1 (thiram plus lindane).

On cucumber seed, all the treatments were used as slurries. Dieldrin plus captan and dieldrin plus thiram were also applied as dusts. For the slurries, the various materials were suspended in a 2% methocel solution. Dosage rates for fungicides were

0.26% and 0.52% of actual toxicant by weight of seed; insecticide dosages were at 1:4 and 1:8 ratios to the fungicides. For the commercial preparations, the original insecticide-fungicide ratios were maintained; they were applied to seed at the rate of 0.26% actual fungicide by weight.

On squash, seed treatments were applied as dusts, except that slurries were used for the commercial preparations and for one treatment of captan plus lindane. Fungicide dosage rates for dusts were 0.13% and 0.26% toxicant by weight; insecticides were used again at the 1:4 and 1:8 insecticide-fungicide ratios. The commercial mixtures were used at the rate of 0.13% actual fungicide by weight of seed, with no change in insecticide-fungicide ratio.

Slurries were applied to cucumber and squash seed at the rate of 1½ pints to 28 pounds of seed.

For uniform coverage, seeds were treated by adding the proper amounts of slurry or dust to weighed seed in a glass jar, which was rotated slowly on a motor-driven wheel for 3 minutes. Until planting time, the treated seed was kept at a temperature of 65° to 75° F.

Seeds were planted evenly in single-row plots 10 to 12 feet long, each plot occurring in random order in each of six blocks. Cucumber plots contained 100 seeds, squash plots 50 seeds, per row. Plantings were made May 22 in fine sandy loam, and May 24 in silt loam. To encourage deposition of eggs by the seedcorn maggot

insect, a band of tankage was spread over each row immediately after planting. The first planting (fine sandy loam) was examined for emergence and maggot injury on June 4, the second planting (silt loam) on June 11. **RESULTS:**

Cucumber—Emergence of cucumber seed in both soil types was improved by all treatments. In most cases, the combination treatments were better than fungicides alone. The laboratory insecticide-fungicide mixtures and the commercial preparations produced similar results.

Analysis of the factorial experiment showed no differences between the captan and the thiram treatments, or between dosage rates. In fine sandy loam dieldrin gave better emergence than either heptachlor or lindane. There was no significant difference between heptachlor and lindane. In silt loam, dieldrin and heptachlor gave comparable results, with significantly greater emergence than from the lindane combinations. In fine sandy loam the 1:4 insecticide-fungicide ratio gave better emergence than the 1:8 ratio, regardless of fungicide dosage rate. Emergence was the same from either insecticide-fungicide ratio of the dieldrin combinations, but the 1:4 ratios were more effective than the 1:8 ratios of heptachlor or lindane. In silt loam, at the 1:8 ratio, emergence was greater with the lower fungicide dosage rate, while at the 1:4 ratio the higher fungicide rate was better.

Squash—The seed-corn maggot caused considerable injury to plants from seed that was untreated or treated with fungicide only, especially in fine sandy loam where about 40 percent of the plants that emerged in un-

(Continued on Page 115)

J. J. Natti, W. T. Schroeder, G. E. R. Hervey, and F. L. McEwen, "Value of insecticide-fungicide combination treatments as protectants for seed of cucumber and winter squash", Plant Disease Reporter, Vol. 42, No. 1, pages 127-133, January 15, 1958.

NEWS about the TRADE



Miller Joins Lerch Co.

Donald L. Miller, director of information for the National Agricultural Chemicals Association for the past three years, has joined Donald Lerch, Jr. & Co., Washington, D. C.



Mr. Miller will act as director of editorial and special services for the firm which provides marketing, editorial, and Washington services for clients in the fields of animal and plant health, agricultural chemicals, farm machinery, commodity markets, dairy production and marketing, and foreign trade. Prior to joining NACA, Mr. Miller had been a newspaper and magazine writer in Washington, had been on the public relations staff of the Westinghouse Electric Corp., and had his own office as a public relations consultant.

CSC Names Two Managers

The Commercial Solvents Corp., New York, has announced the appointment of two district managers. Walter A. Bauer was named manager of the Cleveland office and Robert W. Breidenbach has been named manager of the St. Louis District office.

Mr. Bauer joined CSC in 1952 and has served in Kansas City, Los Angeles, and Chicago. Mr. Breidenbach joined CSC in 1948 and was named assistant to the sales manager of the agricultural chemicals sales department in 1954.

Fertilizer Round Table

The Fertilizer Industry Round Table Proceedings, which have in the past two years been published by *Agricultural Chemicals*, are offered this year by the Association itself. Copies of the 100-page report are available at \$2.50 per copy from Dr. Vincent Sauchelli, National Plant Food Institute, 1700 K Street, N. W., Washington, D. C.

The 1957 Fertilizer Industry Round Table Proceedings include answers to some 80 questions concerning ammoniation, granulation, caking, nitrogen losses, use of inhibitors, metering liquid and dry fertilizers, new equipment, effect of particle size of potash and other elements, etc.

W. L. Gay Retires

W. L. Gay, vice president of Berkshire Chemicals, Inc., New York, in charge of the Agricultural Chemicals Department, retired last month. He will remain with the company as a consultant.

Form Regional Chemicals Co.

George Mock, president of Sprague Spray Service, Seattle, Wash., and Jennings P. Felix, Seattle have formed a new corporation, Regional Chemicals Corp., to market "Slugfest", a liquid spray for control of slugs and snails, and several other products.

Mr. Mock is president of the Washington Association of Ground Sprayers, Inc., and Jennings Felix is secretary-treasurer of the association.

Heads Greenville Plant

Agricultural Chemicals, Inc., Llano, Texas, has named S. L. Calhoun as branch manager of its Greenville, Miss., plant. In addition to his new position, Mr. Calhoun continues to serve the company as consulting entomologist, a position he has held for the past six years.

R. S. Morgan has been named assistant branch manager at Greenville and is in charge of production and sales.

The Board of Directors of the National Agricultural Chemicals Association will meet in Washington, D. C., June 10.

Sinclair Appoints Two

Sinclair Chemicals, Inc., New York, has appointed Maurice E. Peterson as national accounts representative of the Nitrogen Products Division. A former partner in the S-P-S Plant Food Co., Onawa, Iowa, Mr. Peterson joined Sinclair in 1956.

John J. Portz has joined Sinclair as a sales representative in the Nitrogen Products Division. Mr. Portz will handle sales of Sinclair anhydrous ammonia and nitrogen solutions in Iowa, Minnesota, and certain areas in neighboring states. He formerly was employed by Wilson and Geo. Meyer & Co.

Stauffer Names Kettle

James W. Kettle has been named controller and treasurer of the Stauffer Chemical Co., New York. He succeeds Christian de Dampierre as treasurer.

Mr. Kettle, who joined Stauffer as controller in 1954, formerly was associated with the U. S. Steel Co.

OM Shuts Morgantown Plant

The Olin Mathieson Chemical Corp., New York, has notified the government that it intends to stop producing ammonia and methanol at its Morgantown, W. Va., plant by the middle of the year.

The reason for the shutdown, says the company, is that the Morgantown installation is "uneconomical" to run. The plant was built early in World War II and leased from the government in 1951.

Acquires Two Bag Plants

The West Virginia Pulp & Paper Co., New York, has arranged to buy two multiwall bag plants from Arkell & Smiths, Canajoharie, N. Y., for an undisclosed amount of cash. The two plants are located at Wellsburg, W. Va., and Mobile, Ala. Arkell & Smiths' plants at Canajoharie and Hudson Falls, N. Y., are not included in the transaction and will continue to be operated by A.&S.

David L. Luke, president of West Virginia Pulp, said that the two bag plants to be bought from Arkell & Smiths and the two plants of Fulton Bag & Products Co., at New Orleans and St. Louis, acquired by West Virginia, Apr. 1, will become components of a new multiwall bag division of the paper company. The operation marks the company's entry into the multiwall sack converting field, a major market for its new "Clupak" stretchable paper.

The Wellsburg plant of Arkell & Smiths makes only multiwall sacks, while the Mobile plant makes both sewn and pasted multiwall bags, paper pockets and baler bags. Together they employ about 400 people. They will continue to employ present operating and sales organizations under West Virginia Pulp, the company said.

Two Cited By NPFI

Floyd Truesdell of the University of Kentucky and Allan L. Seim of Iowa State College were selected as winners of the National Plant Food Institute's Agronomy Achievement Award for 1958.

Malathion For Stored Grain

Malathion has been cleared by the Federal Food and Drug Administration for direct application to stored grain. This new use follows clearance by the FDA permitting direct use of the product on the bodies of meat type animals and poultry. Malathion is manufactured by the American Cyanamid Co., New York.

Three principal advantages are claimed for malathion by the manufacturer. It gives continuous protection against insect infestation over a long period following storage of grain. The small amount required for this

protection makes it economical to use, and it presents no residue problems.

Move OM Insecticide Office

The Chicago office of the Insecticides Products department of the Industrial Chemicals division, Olin Mathieson Chemical Corporation, has moved into the division's main sales office in the Wrigley Building, 400 N. Michigan Avenue. The department formerly was located at 350 N. Clark Street.

All of the sales offices of the Industrial Chemicals division are now consolidated in the Wrigley Building except those of the Carbon Dioxide department.

Allied Drops "& Dye"

The Allied Chemical & Dye Corp., New York, has become simply Allied Chemical Corporation.

Glen B. Miller, president, said in announcing the change, that the new name more clearly reflects the broad nature of the company's position in the chemical industry and does not single out a particular division or field of activity.

Publicity on Pesticides

The March issue of *Farm Safety Review* carries an article by Don Miller of NACA dealing with safety in pesticide use. This magazine, published by the National Safety Council, goes to State Farm Safety Councils, radio farm press, 4-H and FFA youth groups.

"Home Gardeners Using More Pest Control Chemicals" is another recent article giving favorable publicity to pesticide use. It appears in the April, 1958 issue of the *Southern Seedsman*.

The April issue of *Better Homes and Gardens* also carries a reassuring note for those who may have been concerned with the possible hazard involved in toxic residues on foods. Investigators at the University of California are reported as stating, following a ten year study, that they found "not one instance of possible harm from pesticide residues on food."

Stewart McPherson Joins NACA

Stewart McPherson has just been added to the NACA staff, taking over the work formerly performed by Don



Miller in the Information Department. Mr. McPherson is a graduate of the University of Maryland and has had several years of experience in publicity work in the retail, wholesale and chemical fields.

Don Miller has joined Donald Lerch, Jr. & Company.

Insect Photo Salon

At its annual meeting on June 25-27, the Pacific Branch of the Entomological Society of America will hold its third annual Insect Photo Salon at El Cortez Hotel, San Diego.

The Photo Salon will include photographs of insects, spiders, and related arthropods. The opportunity to exhibit photographs is open to both professionals and amateurs. Dr. Leonard R. Brown, U. of California, Los Angeles, is chairman of the Insect Photo Salon Committee.

Seed Assn. Meeting

The Idaho-Eastern Oregon Seed Assn. will hold its annual meeting June 26-29 at the Sun Valley Lodge, Sun Valley, Idaho.

Set Fire Ant Quarantines

Ninety-two counties and parishes and parts of 49 additional counties and parishes in the States of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas will be regulated, effective May 6, under a quarantine issued by the U.S. Department of Agriculture because of infestation in these areas of the imported fire ant.

Articles subject to regulation when moved interstate from the regulated area are: soil and unprocessed sand and gravel, separately or with other things; forest, field or nursery-grown woody or herbaceous plants with soil attached; plants in pots or containers; grass sod; unmanufactured forest products such as stump wood or timbers if soil is attached; and any other products or articles that may be specifically determined as likely to spread the imported fire ant.



even the daintiest dieters
die for
WARFARIN

The most potent anti-coagulant rodenticide made!

As a result of its extra effectiveness, warfarin will destroy even marginal feeders which consume only very small quantities of bait.

DETHMOR® Warfarin, produced by Penick under strict quality control, is highly effective against all rats and mice. It has good acceptability, will not create tolerance or build bait shyness and is *safe* — approved for use in food establishments.

Shipments made promptly from stocks in New York, Chicago, San Francisco and Portland, Ore.

★ ★ ★

DEALERS AND FORMULATORS: Profit by the aggressive, consistent promotion of DETHMOR Warfarin — now in its ninth year. Plenty of profitable business for all! For information write Penick today.

PENICK

Agricultural Chemical and Insecticide Division

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 • 735 W. DIVISION ST., CHICAGO 10



Mueller To Memphis Area

John D. Mueller, a Crag Agricultural Chemicals sales representative, has been named to cover the Mississippi Delta area for the Union Carbide Chemicals Co., Division of Union Carbide Corp., New York.



Mr. Mueller will headquarter at Memphis, Tennessee, and will concentrate on market development of Sevin experimental insecticide for cotton.

He recently returned to Carbide from service with the U. S. Army Chemical Corps, Fort Detrick, Maryland, where he assisted in research at the Army Biological Warfare Laboratories.

Reschedule Safety Meeting

The Executive committee of the Fertilizer Section of the National Safety Council will hold a meeting at the Roanoke Hotel in Roanoke, Va., on June 4. This involves a change in date because of problems in connection with hotel space, according to the committee.

Oregon Dealers Meet

Dr. Tom Jackson, Oregon State College, gave an illustrated talk on the need of high soil fertility to grow legumes on the "red hill" soils of western Oregon, at the 27th annual convention of the Oregon Feed and Seed Dealers Association in Portland, March 13 and 14.

Dr. Jackson stressed the importance of liming the soils up to a pH of 6.0 or better before attempting to establish legumes. The establishment of sub-clover and alfalfa on upland soils requires large amounts of phosphate, sulfur, and potash, Dr. Jackson said.

Grant Braun of the American Potash Institute presented some estimates of fertilizer requirements for forages in western Oregon, based on recent studies he has made. He said that about 4,000 tons of nitrogen now are used on grains and grasses as compared to a potential need of 12,000 tons. These same crops could use four times the phosphorus they now are using if experiment station recommendations based on soil tests were followed. Mr. Braun stated that the very large potential use for fertilizers in western Oregon is on for-

age crops, pasture, and non-cropland pasture.

An illustrated lecture on the importance of soil tests and demonstration plots as tools for getting a good forage fertility program underway was presented by Todd Tremblay, National Plant Food Institute. Mr. Tremblay stated that dealers are a very important link in helping to get a program started that will emphasize the tremendous potential in fertilizers on forages.

Pennsalt Appoints DeBusk

William DeBusk has been named assistant southern manager, Agricultural Chemicals for the Pennsalt of Washington Division, Pennsalt Chemicals Corp., Tacoma, Wash. Mr. DeBusk's duties include the supervision of Pennsalt's Montgomery, Alabama, operations.

Mr. DeBusk was employed by Pennsalt in 1951 as an agricultural chemicals representative for the Southeast.

AGREM EMULSIFIERS for insecticides & herbicides

All purpose single emulsifiers: AGREM 500, AGREM 600.
Either of these emulsifiers can be used to give flash dispersion and excellent stability to formulations containing chlorinated hydrocarbon toxicants in a wide variety of solvents.

Specific phosphate insecticide emulsifiers: AGREM MP and M, AGREM P, AGREM Q. These emulsifiers are specifically suited to the formulation of Malathion, Parathion and Methyl Parathion.

All purpose twin emulsifiers: AGREM 102 and AGREM 103, AGREM 217 and AGREM 221. These emulsifiers, when blended properly, can be used to produce excellent concentrates containing the chlorinated pesticides and all herbicide esters.

Write today for data, samples and prices!

THEODORE RIEDEBURG ASSOCIATES

415 Lexington Ave.

New York 17, N. Y.

MUrray Hill 7-1488

*Russian
knapweed*



Austrian field cress



Bermuda grass



bindweed



leafy spurge



quack grass



hoary cress



Canada thistle



Johnson grass



What's your one low-cost way to control them all?

You can control the weeds shown here, plus *all other weeds and grasses*, with **OLDBURY®** sodium chlorate, manufactured by Hooker.

It is effective on germinating weed seeds as well as growing roots. Its sterilant effects last up to one year in most sandy soils; and from one to two years in many heavier soils. It gives these results at *lower cost* than any other chemical.

You're in good company when you recommend **OLDBURY** sodium chlorate for broad-spectrum weed control. For

years it has been first choice of many county agents in states where weed control is regulated by law.

Look for this trademark—it gives you these advantages...



Acceptance: Farmers have come to know and trust the **OLDBURY** label wherever it has been introduced.

Dependable service: Fastest delivery you can get in East and South—direct from the nation's largest producer of sodium chlorate. Two plants—Niagara

Falls, N. Y., and Columbus, Miss.—insure plenty of capacity to meet your needs in a hurry.

Technical help: You can use the services of full-time Hooker agronomists. They're equipped to help you plan weed control programs in your area; can advise you on handling, storage, and application of sodium chlorate.

You can get 99% pure **OLDBURY** sodium chlorate in steel drums, 100 and 350 lbs. net. For price and shipping information, write us today.

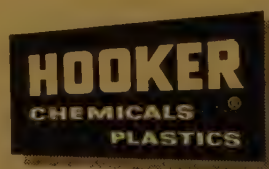
For controlling weeds on railroad right-of-way, you can get the skilled services of specialists who apply formulations made with **OLDBURY** sodium chlorate.

For defoliating cotton in irrigated areas, you can recommend special-purpose sprays made by formulators using **OLDBURY** chlorate.

*If you'd like names and addresses
of these specialist firms, write us.*

HOOKEE ELECTROCHEMICAL COMPANY

605 Buffalo Ave., Niagara Falls, N. Y.



DUREZ® PLASTICS DIVISION • NORTH TONAWANDA, N. Y.
NIALK® CHEMICALS • NIAGARA FALLS, N. Y.
OLDBURY® CHEMICALS • NIAGARA FALLS, N. Y.

Sales Offices: Chicago, Ill.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; Worcester, Mass. In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

New Pesticides Discussed At ACS Convention

THE annual meeting of the American Chemical Society was held April 13-18 in San Francisco, Calif. Some 1500 reports on chemical progress were presented at the meeting, which annually attracts thousands of chemists and engineers. Reports on new pesticide materials highlighted discussions before the ACS Division of Agricultural and Food Chemistry. The following abstracts are of particular interest to the agricultural chemicals industry.

Phaltan, A New Potent Fungicide

D. E. Pack, T. W. Reed, and G. K. Kohn, California Spray-Chemical Corp., Richmond, Calif.

Phaltan, N-(trichloromethylthiophthalimide) is a new analog of Captan (N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide) and has shown exceptional promise for the control of certain diseases of economically important fruits, vegetables, and ornamentals for which present controls are less effective.

Structurally, Phaltan is similar to Captan. Differences exist between it and Captan, however, in the stability to hydrolysis of the molecule and of its imide. These differences require considerable changes in the conditions of synthesis and are reflected in the variations of biological activity. Rates of hydrolysis of Phaltan and Captan have been studied and compared. A spectrophotometric method for residue determinations applicable to Phaltan has been developed and residues on a variety of crops have been determined.

Phaltan has given excellent control without phytotoxicity of the following diseases: downy mildew of grapes (*Plasmopara viticola*), powdery mildew of grapes (*Uncinula Necator*), downy mildew of cucurbits (*Pseudoperonospora cubensis*), black spot (*Diplocarpon rosae*) and powdery mildew of roses (*Sphaerotheca pannosa* var. *rosae*), late blight of tomatoes and potatoes (*Phytophthora infestans*), anthracnose of tomatoes (*Colletotrichum phomoides*), cherry leaf spot of cherries (*Higginsia hiemalis*), brown rot of cherries (*Monilinia fructicola*), scab of citrus (*Elsinoe fawcetti*), melanose of citrus (*Phomopsis citri*), and downy mildew of lettuce (*Bremia lactucae*).

In addition to disease control, plants sprayed with Phaltan frequently exhibit more vigorous growth and greener foliage.

New Organophosphorus Derivatives of p-Thioxane and 2,6-Dimethyl-p-Thioxane with Insecticidal and Acaricidal Activity

A. H. Haubein, Hercules Powder Co., Wilmington, Del.

Several new organophosphorus derivatives of p-thioxane and 2,6-dimethyl-p-

thioxane have been synthesized and found to have insecticidal and acaricidal activity. These compounds were prepared by reaction of the corresponding chloro-p-thioxanes with ammonium O, O-diethyl phosphorothioate in acetone solution or with O, O-diethyl hydrogen phosphorodithioate in benzene solution using catalytic quantities of anhydrous zinc chloride. The synthesis of the chloro-p-thioxanes is described. Some structure-activity relationships of the organophosphorus esters are postulated.

Iminyl Phosphates, a New Class of Pesticides

Martin J. Diamond, California Spray-Chemical Corp., Richmond, Calif.

A new class of organophosphorus compounds has been discovered which shows miticidal and insecticidal activity, and in some cases even exhibits a degree of systemic activity. These compounds have been named O-iminyl phosphates.

They can be prepared by the reaction between the salt of an oxime and a halophosphate.

Among the more interesting compounds prepared were those using diethyl chlorophosphate or diethyl chlorothionophosphate as the phosphorus moiety and the oximes of the following ketones: acetone, methyl n-propyl ketone, methyl isopropyl ketone, methyl cyclopropyl ketone, mesityl oxide, methyl butyl ketones, chloroacetone, acetoacetic ester, cyclohexanone, p-chloroacetophenone, isophorone, acetylacetone, and dimethylglyoxime.

The following principal characteristic absorption bands were observed in the infrared spectra of samples purified by distillation at reduced pressure: 6.0 microns assigned to C=N, 7.8 microns representing P=O (or 15+ microns in the case of P=S), and 9.9 microns representing the P-O-C band. Elemental analysis confirmed the empirical formulas.

The compounds to be tested were formulated in a mixed xylene solvent with a commercial nonionic emulsifier of the alkylphenyl polyethylene glycol type. Initial biological screening was performed on the fly, *Musca domestica*, and two-spotted mite, *Tetranychus bimaculatus* Harvey.

Permanent Mothproofing of Wool with Dieldrin

L. E. Mitchell and A. Williams, Shell Chemical Corp., New York, N. Y.

Dieldrin is an effective compound in controlling clothes moths and carpet beetles. When applied to wool in a hot acid bath, for example, commercial die bath — Dieldrin becomes, for all practical purposes, permanently fixed in the wool fabric. It has been found by analyses that the Dieldrin is evenly distributed in the wool at the desired level. On the basis of chemical analyses and biological assay, the Dieldrin content is not substantially reduced by repeated washings or dry cleanings. Thus the ASTM tests for permanent mothproofing are satisfied.

Determination of Trithion Residues

B. J. Luberoff, R. E. Kugel, A. C. Nuzzo, and G. G. Patchett, Stauffer Chemical Co., Chauncey, N. Y., and Richmond, Calif.

Trithion is a nonsystemic phosphorodithioate of value in the control of mites and insects.

On the plant surface it is converted, by atmospheric oxygen and moisture, to mixtures of more completely oxygenated anticholinesterase phosphorothioates. Although Trithion itself exhibits anticholinesterase activity, its oxygenated derivatives are considerably more potent. The determination of Trithion residues depends on oxidation of the mixed phosphorothioates to a common, powerfully inhibitory material whose concentration is determined by measuring its inhibition of human blood plasma cholinesterase, in vitro, by an adaptation of the method of Giang and Hall [*Anal. Chem.*, 23, 1850 (1951)].

A benzene extract of the plant material is treated with aqueous peracetic acid to effect the desired oxidation. A buffered solution of cholinesterase is incubated with the oxidized extract, and residual enzyme activity is estimated by measuring the change in pH on further incubation with acetyl choline. Enzyme activity is converted to equivalent Trithion concentration by reference to calibration curves which are discussed in some detail. Plant residues of Trithion can thus be routinely determined at the 0.05 p.p.m. level.

Tedion Residues on Fruits

C. C. Cassil and O. H. Fullmer, Niagara Chemical Division, FMC, Richmond, Calif.

The compound 2,4,5,4'-tetrachlorodiphenyl sulfone, known as Tedion, is a very effective acaricide against several species of mites. Data are given showing the magnitude of Tedion spray surface residues found on apples, pears, peaches, lemons, and oranges. Time studies on these fruits demonstrate that Tedion residues diminish largely as a result of fruit growth and not by decomposition. Additional results illustrate what magnitude of Tedion residues may be expected on apples, pears, peaches, plums, and prunes when sprays are applied from 3 to 130 days before harvest time. Maximum residues found from sprays containing 1 pound of Tedion 25% wettable powder per 100 gallons of water on these fruits varied from 1.3 to 3.6 p.p.m.

Pesticide Residue Analyses

Percy B. Polen and Charles F. Meyer, Velsicol Chemical Corp., Chicago, Ill.

The art of analytical chemistry is generally practiced with the aid of many assumptions pertaining to the composition of solvents and reagents used in analyses. In most chemical analyses, where mole fraction of the measured component ranges from unity to 10^{-3} , assumptions about the composition of the solvent do not seriously affect the validity of the analytical data. In pesticide residue analyses, however, where mole fractions of components sought are about 10^{-4} to 10^{-8} , the errors arising from these assumptions may be several magnitudes greater than the values for these components.

Forest Fertilization Conference Held In Sonora, California

A FOREST fertilization research program for California was proposed at a forest soils fertilization conference held in Sonora, Calif., Feb. 28, under the sponsorship of the National Plant Food Institute and the California Fertilizer Association.

The proposal was made by Dr. Edward C. Stone, assistant professor of forestry, University of California, Berkeley, who said that a research program initially limited to two species and ten soil types would not be expensive and could be highly effective. He said that the key question is whether a dollar's worth of fertilizer used today will pay its way if it has to be carried on the books at three or four per cent interest for 50 or 75 years. He added that a research program should make it possible to clearly define and evaluate the potential role of fertilizers in forest management.

Knox Marshall, Forest Engineer, Western Pine Association, Sacramento, told the conference that very little work has been done to date on fertilization of forest soils in California. He pointed out that the lumberman has other problems which have kept him engrossed, such as fire, insect damage, and disease. He said that there is need for better knowledge as to what natural growth can be expected in second growth stands, before the possible benefits of fertilization can be measured, but that owners of second-growth tree farms will be interested in any economic means of stimulating growth of their trees. He felt that the use of fertilizers would be beneficial in this area, and in overcoming regeneration problems.

A report on extensive forest soils fertilization research in Washington was presented by Dr. R. B. Walker, Department of Botany, University of Washington, Seattle. He said that the nutrient removal from the soil by many commercial lumber trees approaches that of agricultural crops. In greenhouse studies, it has been shown that nitrogen, applied at the rate of 50 pounds per acre, produced a 50 per cent increase in terminal leader

growth of Douglas fir and Western Red Cedar, he said.

Dr. Walker said that Crown-Zellerbach Corp., Seattle, has been testing the placement of very slowly soluble pellets of urea-formaldehyde and superphosphate in some of its timber plantation land along the Coast, with excellent results. Christmas tree color is improved, he concluded.

Dr. E. T. York, Northeast Manager, American Potash Institute, told of his observations of forest soil fertilization research during a recent visit to West Germany. He also reported a U. S. Forest service estimate that if industrial wood maintains its present relative place in the U.S. economy, the demand could be as much as 40 per cent greater in 1975 than it was in 1952, and that this demand could be more than double present needs by the year 2000.

Dr. York pointed out that efforts must be directed towards increasing the productivity of our forest lands, and that it is natural that attention be directed toward possible economic use of fertilizers. He said that to date little work has been done on the subject of forest soil fertilization research in the United States but since World War II, work which had been going on in Europe has been speeded up. He specifically named Great Britain, Sweden, Denmark, Holland, and Germany.

To Continue As Sub-Agents

Greene Trading Co., New York, formerly sub-agents for various pyrethrum interests in Africa, will continue to act as sub-agents in the United States for the East African Extract Corp., Ltd., Nairobi.

Greene will handle the sale of pyrethrum extract originating from Kenya's only processing plant. The East African Extract Corp., which owns the plant, has an annual allocation of flowers from the Pyrethrum Board of Kenya. The plant has been producing pyrethrum extract for world markets for the past 11 years.

On FMC Executive Committee

The Food Machinery and Chemical Corp., New York, has appointed William N. Williams and Jackson V. Vernon as



W. Williams



J. Vernon

new members of its Chemical Divisions Executive Committee.

Mr. Williams will have functional responsibility for engineering and manufacturing in FMC's Chemical Divisions, moving up from his former position as Manager of the Westvaco Mineral Products Division. Mr. Vernon moves up from his previous position as Manager of the Niagara Chemical Division, and will have functional responsibility for marketing and distribution in FMC's Chemical Divisions.

Mr. Williams has been associated with Westvaco and its predecessor companies for over twenty-five years. Before becoming division manager, he had been vice president in charge of production. Earlier he had been general manager of the division's Western operations.

Mr. Vernon became President of Niagara Chemical Division in 1952, after holding a succession of sales posts. He previously had been vice president and sales manager. In conjunction with his sales efforts, he also specialized in developing Niagara's distribution and marketing channels. Mr. Vernon is president of NACA.

Replacing Mr. Williams as Manager of Westvaco Mineral Products Division is Raymond F. Moran, Manager of the Newark, California plant. Stuart H. Bear has been appointed manager of Niagara Chemical Division.

Potash Sales Up Slightly

The American Potash Institute has announced that deliveries of potash for agricultural purposes in the United States, Canada, Puerto Rico, and Hawaii by the eight principal producers and also by the importers totaled 3,461,578 tons of salts containing an equivalent of 2,026,239 tons potassium oxide during 1957.

This was an increase of less than one per cent in salts and potassium oxide over 1956. Agricultural potash accounted for nearly 95 per cent of the deliveries. Muriate of potash continued to be the most popular material, comprising over 93 per cent of the potassium oxide delivered for agricultural purposes.

NOW

Espesol 5 Registered For Labeling Purposes As A XYLENE-BASE SOLVENT



**Formulator-proven as an
economical, non-phytotoxic diluent
with dependable uniformity!**

Now registered as a xylene-base solvent, Espesol 5 meets all the demands of formulators who require an economical water-white, xylene-base diluent possessing absolute uniformity. Being a direct unit-produced, rather than a blended product, Espesol 5 provides you with (1) a constant weight (pounds per gallon) (2) uniform flash point (3) consistent aromatic content. With its narrow boiling range, Espesol 5 offers a fast evaporation rate and its high percentage of aromatics provides high solvency power.

Approved by government and college experiment and extension facilities, Espesol 5 is a premium quality, high specification diluent that will let you offer your customers a premium product. Available to you on short notice from all of Eastern States' terminal facilities, Espesol 5 can be ordered in drum, transport, tank car, barge and ship tank lots,

Mail coupon below for complete information.

EASTERN STATES PETROLEUM & CHEMICAL Corporation

(Formerly Eastern States Chemical Corporation)

P. O. Box 5008 • Houston 12, Texas • Phone WAInut 3-1651

Chicago Office: 1011 Lake Street, Oak Park, Ill.,
Phone Village 8-5410

New York Office: 10 Rockefeller Plaza, New York, N.Y.,
Phone Circle 7-2520

Cleveland Office: 20800 Center Ridge Rd.
Phone EDison 3-0188

U. S. TERMINALS: Houston, Texas Chicago, Illinois

EUROPEAN TERMINALS: Dordrecht (Rotterdam), Netherlands

East Liverpool, Ohio

Antwerp, Belgium

Madison, Indiana

Ludwigshafen, Germany

Brownsville, Texas

Livorno (Leghorn), Italy

	Eastern States Petroleum & Chemical Corporation P. O. Box 5008, Dept. AC-5-8, Houston 12, Texas
Please send me free booklet on the characteristics and properties of insecticide solvents.	
NAME _____	
FIRM _____	
ADDRESS _____	
CITY _____	ZONE _____ STATE _____



*One machine to handle
ALL bulk and bagged materials*

Illinois fertilizer plant buys Michigan's quarry-proved dependability

To everyone who uses material-handling equipment, the problem of dependability is a critical matter. It becomes absolutely vital, though, when you're like Hoover Soil Service of Gilman, Illinois.

Hoover's problem was to find a machine which *by itself* could handle *all* material in their bustling, 20-year-old fertilizer plant. It had to be fast and versatile and, above all, as trouble-free as possible. Their study of available units included the usual comparison of specs, talks with salesmen and users, pricing, and so on.

Power Shift, Torque Converter

"Our ultimate choice was a Michigan Tractor Shovel!" says Owner Roy Hoover.



Loading bagged mixed fertilizer onto truck, Michigan often lifts 18 bags (1,440 lbs) at once.

"There were lots of reasons. But the clincher came the day we learned that our neighbors, Lehigh Stone Company of Kankakee had changed to Michigans and were very happy with them. If a Michigan could work satisfactorily under the constant use of their quarry, we reasoned it certainly would do well on our less-punishing job. The size we wanted, Michigan's 15 cubic foot Model 12B, we noted had many of the same design features as the larger quarry-model Michigans (including power-shift, torque converter, planetary axles). So we got it—and it's done even better than we hoped."

Drives safely, quickly in traffic

Today the 44 hp, 11 mph Michigan does *all* handling and *all* lifting not only at Hoover's main plant but also at their auxiliary warehouse four blocks away. Trips back and forth take only two to five minutes despite necessity to travel along the town's busy main street (U.S. 54-45-24).

Easily maneuvers through 5' door

Unloading boxcars is a typical job. Average 50 ton car requires less than 100 trips for complete unloading, according to Owner Hoover. "Michigan has no trouble getting in or out of any single-door car," he adds, "regardless of whether it has a 5-foot or 6-foot door. Our

bucket has been extended two inches, too, over the standard bucket."

Feeds mixer, lifts bags, spots cars

Other Michigan jobs include stockpiling bulk phosphate, potash, urea and other raw materials and feeding the one-ton mixer. Michigan also hauls bags of mixed fertilizer. It loads both bagged and bulk material onto trucks. It spots boxcars, one or two at a time, both loaded and empty. Despite its heavy work schedule a simple maintenance program has reduced downtime to practically zero.

See 12B in action in your plant

Dependability and versatility like this are features of *every* Michigan Tractor Shovel. Let your Michigan distributor help you pick the size best suited to your needs: 6 cubic feet to 5 cubic yards.

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2463 Pipestone Road
Benton Harbor 8, Michigan

**CLARK®
EQUIPMENT**

Cyanamid Staff Engineer

Daniel O. Walstad has been appointed a staff engineer, Agricultural Division, American Cyanamid Co., New York.



In his new post Mr. Walstad assumes a number of duties which include important liaison work in technical chemical sales, manufacturing and research on product development. He is responsible for chemical aspects relating to product performance and advises on process and product quality problems.

Prior to joining Cyanamid, Mr. Walstad headed the U. S. Army Chemical Corps Phosphates Development Works, a joint project of the Army and Tennessee Valley Authority.

Monsanto Names Holzapfel

Fred J. Holzapfel has been appointed director of engineering for Monsanto Chemical Company's Organic Chemicals Division in St. Louis.

Mr. Holzapfel has been associate director of engineering for the division since December, 1957. He succeeds Proctor H. Avon who is transferring to Monsanto's Plastics Division at Springfield, Mass.

Attend Fertilizer Meeting

About 50 fertilizer dealers and manufacturers representatives attended a meeting at Chehalis, Washington, on March 10 to hear the latest information on fertilizer recommendations and sales techniques.

County agent Ralph Hoffer presented a discussion on the need for a good fertility program on the average dairy farm. He presented figures to show that the average 60-acre dairy farm in Lewis County, Washington should be using about \$1,000 worth of commercial fertilizer per year. Phosphate and potash needs of the soil can accurately be determined by means of soil tests, Mr. Hoffer suggested, but other factors such as forage species, soil organic matter availability, irrigation, and certain climatic factors, influence the amount of nitrogen needed on the individual pasture.

Ed Minnick, county extension agent in charge of soil testing, gave an illustrated talk on soil testing results in the county. He said that the average increase in yield of some demonstration plots, where 120

pounds of phosphorus per acre were applied according to soil test needs, was one ton of forage which had a net value of about \$8 per acre.

A local Chehalis dealer, Floyd Helm, discussed some of the problems that beset a fertilizer dealer and emphasized the need for the dealer to be up-to-date on fertilizer trials going on in his own area.

NPFI Farm Radio News

Four outstanding agricultural leaders and scientists will be featured on the 20th series of the National Plant Food Institute's recorded Farm Radio News Service.

The speakers and their subjects will be: Dr. Byron T. Shaw, Agricultural Research Service, USDA, "Don't Sell Production Short"; Dr. Guy W. Smith, Soil Conservation Service, USDA, "Take Inventory of Your Soil"; Dr. Lewis B. Nelson, Soil and Water Conservation Research Division, USDA, "Fertilizer and Lime Aid Soil Conservation"; and Dr. O. R. Neal, State Experiment Stations Division, USDA, "Progress in Soil Fertility."

Attain Capacity Increase

A 250 per cent capacity increase in sulfuric acid production has been attained at the Beaumont, Tex., plant of Olin Mathieson Chemical Corp. Additional construction at the site includes a new facility for the manufacture of ammonium sulfate, the major part of which is a 500-ton per day sulfuric acid plant.

Previously, there were two 100-ton plants operating on sulfur. The new facility is a sulfuric acid regeneration plant operating on raw materials from nearby oil refineries.

Owens-Illinois Names 3

The Owens-Illinois Glass Co., Toledo, Ohio, has announced the creation of three new positions in its Mul-tiwall Bag Division.

James C. O'Neal Jr. has been named sales assistant, William F. Connelly is production assistant, and William H. Morris is product sales manager. Tom W. Brown Jr. recently was appointed manager of the division.

U.S.I. Field Representative

Robert M. Niquette has been appointed as a field representative for Morea liquid livestock feed supplement sales by the U. S. Industrial Chemicals Co., Division of National Distillers & Chemical Corp., N. Y.



Mr. Niquette, whose headquarters are in New York, will help develop sales of morea liquid feeds for ruminant animals in livestock and dairy-ing areas along the Eastern Seaboard.

Miller Sells Fungicide 658

Union Carbide Chemicals Company, Division of Union Carbide Corp., New York, has licensed Miller Chemical and Fertilizer Corp., Baltimore, to manufacture and market fungicide 658, formerly sold by Carbide as Crag fungicide 658.

Miller Chemical will sell the finished product to vegetable, fruit, and peanut growers through established distribution channels, according to Carbide. Principal diseases controlled by fungicide 658 are: early and late blight on potatoes; early and late blight, and *Septoria* leaf spot on tomatoes; downy mildew, anthracnose, scab, and *Macrosporium* leaf spot on melons, cantalopes, and cucumbers; *Cercospora* leaf spot on peanuts; *Phytophthora* brown rot and botrytis on citrus; and *Dothiorella* rot on avocados.

The fungicide is long-lasting, effective, and mild. It combines the protection properties of copper, zinc, and chromium, and has not harmed foliage in tests and under actual use conditions. The Miller product will be marketed as a wettable powder and as dusts.

Tolerance For Toxaphene

The Food and Drug Administration has established a tolerance of five parts per million of Toxaphene on barley, oats, rice, rye, and wheat.

The label approval issued by the USDA for both Toxaphene dusts and sprays states that Toxaphene formulations may be applied up to within one week from harvest on wheat, rye, and oats, and up to within two weeks from harvest on barley and rice.

Phillips '57 Sales Up

The Phillips Chemical Co., Bartlesville, Okla., reported a 20 per cent rise in fertilizer sales volume during 1957 over the previous year. Anhydrous ammonia production at the rate of 1,060 tons daily was ten per cent higher than 1956. Ammonium sulfate output remained approximately the same at 1,150 tons a day and there was a 15 per cent rise in production of ammonium nitrate to a daily average of 355 tons.

Fertilizers For Flax

The value of commercial fertilizers for flax sown on summerfallow has been studied at the Canada Department of Agriculture Experimental Farm, Indian Head, Sask., for the past three years. A number of the standard commercial fertilizers and formulated fertilizers with varying rates of ammonium nitrate and superphosphate were compared. The ammonium nitrate was applied on the surface of the soil before seeding and the superphosphate was drilled in at seeding time.

E. V. McCurdy, agronomist in the Field Husbandry Division of the Farm, says that under certain climatic conditions, fertilizers affect the emergence of flax seedlings. In 1957, he says, rates of 20 to 40 pounds of 11-48-0 were used. They did not reduce the stand of flax, but 100 pounds of 16-20-0 did bring a slight reduction and from 75 to 100 pounds of 27-14-0 brought a much more severe reduction. In the past three-year period the increased yields resulting from 20, 30 or 40 pounds of 11-48-0 were about the same, amounting to approximately one bushel per acre, but when 100 pounds 16-20-0 was used, the fertilizer plots averaged 16.2 bushels compared with 13.9 bushels for the checks. In some cases, even though the stand was thinned, the fertilized flax plants branched more and yields were slightly increased.

In another test, ammonium nitrate at 100 pounds to the acre and 11-48-0 at 40 pounds were applied to flax sown on stubble. The average increase amounted to over three bush-

els per acre, indicating a greater response to fertilizer by flax sown on stubble than when sown on summerfallow under the conditions existing last year.

Named Vice President

Nopco Chemical Co., Harrison, N.J., has announced the election of Dr. Melvin Hochberg as vice president in charge of the Fine Chemicals Division. This division recently was expanded to include the Agricultural, Vitex, and Special Markets departments.

New DuPont Plant Producing

E. I. duPont de Nemours & Co., Wilmington, Del., has started production at its new sulfuric acid plant at Ecorse, Michigan.

According to the company, the unit can produce twice as much acid as the two previous plants in the area, both of which are being dismantled. The Ecorse works will produce all strengths of acid.

Alanap As Peach Thinner

Alanap, a selective herbicide for cucumbers and melons, appears to be a promising peach thinning chemical, according to T. B. Harrison of the Harrow, Experimental Farm, Canada Department of Agriculture, who says formulations containing this chemical permit some estimate of bloom set and yet do not delay the thinning operation unduly or cause serious injury to the fruit trees.

Despite three years of testing, however, he advises growers to use Alanap on a trial basis. Comparable trees should be left untreated and records should be maintained during and after chemical applications, for use in future spraying.

Results of tests so far indicate little risk at the 100 ppm concentration but in some years and on some varieties this may not be sufficient, particularly on the Halehaven variety. The chemical should be applied as uniformly as possible before all petals have fallen from the tree and preferably on a mild cloudy day. If drying is too rapid, nothing might happen, Mr. Harrison said.

New AgChemical Rep.

Ralph Clarke Williams joined the staff of "Agricultural Chemicals" last month, as an advertising salesman in the eastern area. He works directly with Ralph Dorland, advertising manager.



Mr. Williams has worked in the advertising department of Macy's and most recently held a position as assistant to the advertising manager at United Artists, New York.

Revamp Allied Department

Nitrogen Division, Allied Chemical & Dye Corp., New York, has announced a reorganization of its Development Department, located at Hopewell, Va.

The reorganization, which became effective April 1, gives the Department a structure in which work on existing research projects can be expedited and new areas of research fully explored, according to the company. Under the new organization, Dr. E. D. Crittenden, formerly director of research, becomes a consultant to division Vice President F. O. Agel.

Two New Bradley Mills

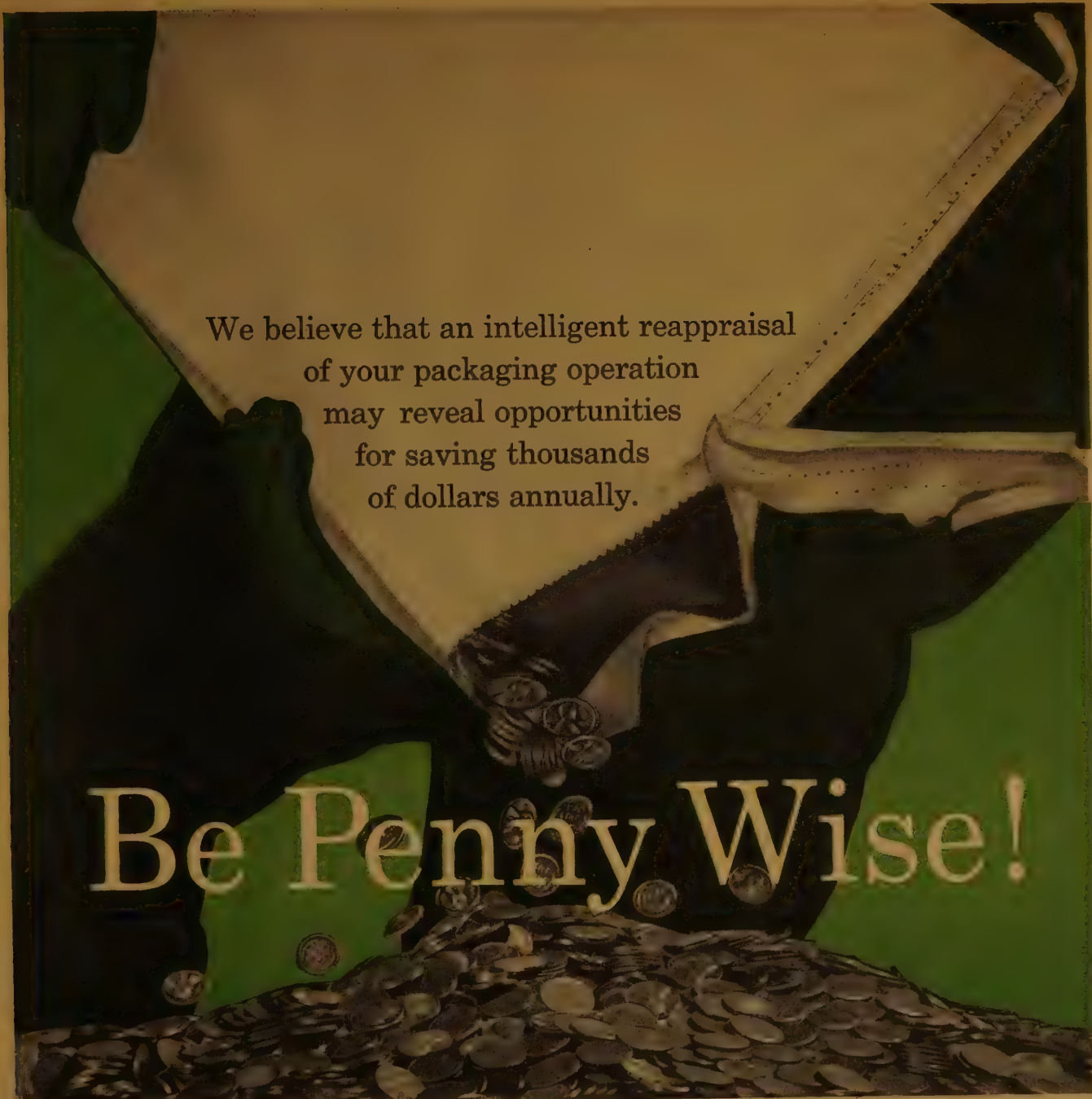
The Bradley Pulverizer Co., Allentown, Pa., is erecting two new Bradley Pneumatic Hercules Mills. One is bound for the Dominion Fertilizer Co., Port Maitland, Ontario, and will be used for grinding phosphate rock for fertilizers.

The second mill will be installed at the Lycoming Silica Sand Co., Jersey Shore, Pa. This mill will be used to produce agricultural limestone.

Controls Hops Disease

George Koch, development biochemist of Chas. Pfizer & Co., Brooklyn, told a recent Pfizer workshop that healthier hop crops now are possible in the Pacific Northwest through the use of antibiotics for protection against downy mildew disease.

Speaking to Pfizer market researchers and sales representatives, Mr. Koch said that Agri-mycin has been used under field conditions in the Far West to control this systemic disease.



We believe that an intelligent reappraisal
of your packaging operation
may reveal opportunities
for saving thousands
of dollars annually.

Be Penny Wise!

IN BUYING MULTIWALL BAGS NO SAVING IS TOO SMALL TO IGNORE!



THE KRAFTPACKER Open Mouth Bag Filling Machine, for free-flowing material, automatically saves pennies, too, through higher production and greater accuracy. Requires a lower investment and maintenance cost than any other automatic machine of its type in use today!

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary
630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Integrated mills at St. Marys, Georgia
and Gilman, Vermont

Exclusive Sales Agents for Kraftpacker

Show me how to save on my
multiwall bag packaging.

COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....

PRODUCT MFD.....

NAME.....



AC

PREFERRED FOR
use by more and
more makers of
AGRICULTURAL
CHEMICALS



Handwheel Operated



Lever Operated



Power Operated

Grinnell-Saunders Diaphragm Valve

... the valve unsurpassed for handling fertilizer chemicals as diverse as nitric, sulphuric, phosphoric acids and their ammonium, sodium or potassium salts

Whether diaphragm is "open" or "closed", valve's bonnet mechanism never comes in direct contact with the fluid stream — thus preventing abrasion and corrosion of those working parts.

For the same reason, because diaphragm completely seals off working parts, stem leaks are impossible.

Grinnell-Saunders Diaphragm Valves are available in a wide range of body, lining and diaphragm materials. If you have a valve problem, write Grinnell Company, Inc., 277 West Exchange St., Providence, Rhode Island.

GRINNELL
WHENEVER PIPING IS INVOLVED

Choice of Materials

Bodies — iron; cast steel; stainless steel; alloy "20"; Hastelloy A, B, C; aluminum; PVC (polyvinyl chloride); Saran

Body Linings — hard rubber; soft rubber; neoprene; glass; lead; plastics; Heresite; Lithcote

Diaphragms — soft natural rubber; natural rubber; white synthetic rubber; neoprene; reinforced neoprene; butyl; Hycar; Teflon; Kel-F; PVC (polyvinyl chloride); polyethylene

Bonnets — iron; stainless steel; other materials on special order

Choice of Bonnets

Handwheel (non-indicating stem, indicating stem); chain wheel; lever (for quick operation); sliding stem (for a wide selection of power operated topworks)

Choice of Bodies

Conventional weir type

Straight — screwed; flanged; socket weld; butt weld; socket (solder); sanitary threads; hose ends; Victaulic

Angle — screwed; flanged; socket weld

Other types

Straightway Valves offer straight thru flow. (Plastic diaphragms not available.)

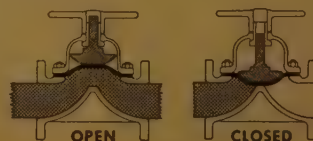
Operating Features

- diaphragm completely isolates bonnet mechanism from the fluid in the-line

- diaphragm lifts high for streamline flow in either direction

- diaphragm presses tight for positive closure

- simple maintenance—diaphragm easily replaced without removing valve body from line



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic fire protection systems • Amco air conditioning systems

Meyer Occupies New Plant



Shown at the dedication of Wilson & Geo. Meyer & Co.'s new Southern California offices are: (left to right) Jeffery W. Meyer, vice president; T. W. Harris, vice president and manager of the Southwestern division; John Hooper, manager of agricultural sales, Southwestern division; and Wilson Meyer, president.

The new plant is located in Los Angeles and doubles the firm's former Southern California facilities.

Named Velsicol Chairman

Joseph Regenstein Jr., previously president of the Velsicol Chemical Corp., Chicago, was named chairman of the board at the company's annual stockholders meeting.

E. T. Collinsworth Jr., previously executive vice president, was named president. At the same meeting, John F. Kirk, vice president and director of sales, was appointed to the board of directors.

Approve Hooker, Shea Merger

The boards of directors of Hooker Electrochemical Co., Niagara Falls, N. Y., and Shea Chemical Corp., New York, last month approved a formal agreement for the consolidation of the two companies, subject to the approval of the stockholders of each company at special meeting called for May 28.

Under terms of the proposed consolidation, Hooker will be the continuing company and its name will be changed to Hooker Chemical Corp. Shea produces and sells sodium tripolyphosphate, dicalcium phosphate, phosphoric acid, tetra sodium pyrophosphate, ferrophosphorus and a number of other phosphorus com-

pounds, none of which are included in the phosphorus products produced by Hooker. Shea has plants at Columbia, Tenn.; Dallas, Texas; Jeffersonville, Ind.; and Adams, Mass.

Cyanamid Names Three

Dr. J. T. Thurston, B. F. Bowman, and G. L. Oppel have been appointed to posts in the Agricultural Division of American Cyanamid Co., New York.

Dr. Thurston has been appointed technical director, Mr. Bowman marketing director, and Mr. Oppel manager of manufacturing. The Agricultural Division recently was created through the merger of Cyanamid's Farm and Home and Phosphates and Nitrogen divisions.

New Firm in Oakland

Nevada Agricultural Minerals, Inc. has been organized in Oakland, Calif. Directors are Herbert E. Peterson, 2131 Harvard, Palo Alto, and F. J. and M. W. Gutte, 3816 Park Blvd., Oakland.

North Central Branch Discusses Systemics

A PANEL discussion on animal systemic insecticides was moderated by A. W. Lindquist, USDA, at the meeting of the North Central Branch, Entomological Society of America in St. Louis, March 26 to 28. Mr. Lindquist said that more needs to be known about the timing of applications and the mode of action of systemics within the animal's body.

Dr. G. R. DeFoliart, University of Wyoming, told of tests involving some 500 animals, wherein the systemic materials were administered orally through feed, injected into the animal, and sprayed on its hide. He said that the need is for an orally-taken compound that will control both grubs and lice. So far, he said, there is no product that will do both.

Dr. William M. Rogoff, University of South Dakota, reported that previous tests with systemics for control of cattle parasites showed sufficient promise to warrant a much larger program. A program launched last year involved 2,000 head of livestock,

2nd International Congress

The second International Congress of Pest Control Operators is being held May 14 to 18 in Vienna, Austria.

New FMC Departments

The Food Machinery and Chemical Corp., New York, has created two new operating chemical departments. They are the FMC Organic Chemicals Department and the FMC Inorganic Chemicals Department.

The Organic department includes the Niagara Chemical Division and the Chemicals and Plastics Division, formerly the Organic Chemicals Division. The Inorganic department is comprised of the Becco Chemical Division, the Westvaco Chlor-Alkali Division, and the Westvaco Mineral Products Division.

Alfred T. Loeffler, FMC Vice President, is named general manager of the new Organic Chemicals Department. General manager of the Inorganic Chemicals Department is Frederick A. Gilbert.

he said. Significant results were obtained in the tests, Dr. Rogoff reported, with the treated cattle averaging 1.3 grubs each as compared to 15.4 on the untreated livestock. Toxic effects were noted, however, under some conditions. He pointed out that systemics can be used without too serious ill-effects, but more care must be taken than the average cattleman is likely to give.

A talk on the intricacies of radioisotope determination of the distribution and rate of systemic insecticides in animals was given by Dr. C. C. Roan, Kansas State College. His discussion indicated that the use of isotopes is helpful in the detection of residues in animals, but because of deterioration of the isotopes over a period of time, such use does not provide an absolute measurement.

A session on cereal and forage crops at the meeting featured a wide range of discussions on pest control in corn, meadows, and sorghum.

(Continued on Page 93)

**NEW! SPENSOL[®]
GREEN[™]**

CUTS CORROSION COSTS



Joe Sharp, Director of Technical Service, Agricultural Chemicals Division, Spencer Chemical Company, supplies . . .

Answers To Your Questions About

NEW SPENSOL[®] GREEN[™]

(TRADEMARK)

Q How did you arrive at the fact that new SPENSOL GREEN is 40% less corrosive?

A This was figured on a corrosion comparison of the weight loss of mild steel test plates, 2" x 3", each containing a weld bead. If we had cut the plates down to the weld bead, the percentage loss of weight could have been as much as 500%, since corrosion attacks most severely in the weld area.

It's all relative, but when the solution eats through the weld bead in the tank, it's 100% no good. With new SPENSOL GREEN, tanks, sparger and distributor last far longer.

Q Have you compared new SPENSOL GREEN with other brands, or only with old SPENSOL?

A In our testing, we compared the corrosion properties of six competitive am-

moniating solutions and SPENSOL with new SPENSOL GREEN. Here are the results of our most recent tests:

Sample Number	Corrosion (Inches Per Year)	Variation From SPENSOL GREEN
1	.021	91%
2	.024	118%
3	.300	2,630%
4	.022	100%
5	.234	2,030%
6	.017	54.5%
Old SPENSOL	.017	54.5%
SPENSOL GREEN	.011	—

As you can see, the "40% less corrosive" is a conservative statement.

Q Does SPENSOL GREEN cost more than other popular ammoniating Solutions?

A No. So why buy ammonium nitrate solutions that give you less corrosion con-

trol when SPENSOL GREEN costs no more?

Q Will I have to change my mixing process to use new SPENSOL GREEN?

A No. You use SPENSOL GREEN the same way you would use any ammonium nitrate solution. It can be added to the ammoniator, whether your plant is set up for continuous production or a batch process operation. Because the basic specifications and mixing properties of SPENSOL GREEN are still the same, the handling, measuring and metering are the same as with SPENSOL.

Q Can I count on SPENSOL GREEN to decrease my down time during peak seasons?

A Certainly! Leaks caused by corrosions are a principal reason for plant shutdowns. SPENSOL GREEN should end much of this trouble.



America's Growing Name in Chemicals

SPENCER CHEMICAL CO., Dwight Bldg., Kansas City 5, Mo.; District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Kansas City, Mo.; Works: Pittsburg, Kans.; Chicago, Ill.; Henderson, Ky.; Vicksburg, Miss.; Orange, Tex.

Insist on SPENSOL GREEN (Spencer Nitrogen Solutions)

AGRICULTURAL CHEMICALS

Glenn D. Moore, Northrup, King & Co., Minneapolis, outlined some of the problems confronting seed firms in control of insects attacking field and sweet corn at both research and commercial levels. He reported that a number of successful techniques had been worked out to protect young plants from insect pest attack.

Lawrence K. Cutkomp, University of Minnesota, described a recent experiment made with granular insecticides for grasshopper control in Minnesota. Formulations of both aldrin and heptachlor were applied to an alfalfa field infested with adults and older nymphs of the red-legged grasshopper.

Small doses of both aldrin and heptachlor were applied, ranging from three to ten ounces per acre. Because these dosages gave nearly complete control of the grasshopper throughout the treated area, Dr. Cutkomp said, it was difficult to determine the lowest effective rate of application for either insecticide. However, the results appeared very promising for these formulations at very low doses, he continued.

C. C. Burkhardt, assistant entomologist at the Kansas State Agricultural Experiment Station, discussed control of insects attacking sorghum. One of the major areas of damage, he said, lies in the hollowing out of seeds, preventing germination. Insecticides effective in preventing this damage to seeds, as reported by Mr. Burkhardt, included aldrin, lindane, heptachlor, panogen, and dieldrin. Stand increases with various treatments were significant, he said, ranging from 25 x 5 per cent to 36 x 7 per cent with various treatments.

Dr. Roscoe Hill, University of Wisconsin, took over the office of president of the North Central Branch for 1958, succeeding Donald A. Wilbur, Manhattan, Kans., whose term expired at the meeting. Dr. J. W. Apple, University of Wisconsin, was named president-elect. Other officers named at the meeting included: Dr. P. C. Stone, University of Missouri, as executive committeeman at large; Dr. C. W. Wingo, University of Missouri, will remain as secretary-treasurer; and J. Everett Bussart, Velsicol

Chemical Corp., Chicago, continues as North Central Branch representative to the ESA governing board.

Kentucky Fertilizer Conf.

The annual Kentucky Fertilizer Conference for manufacturers, salesmen, dealers, and others interested in the distribution of fertilizers in Kentucky is scheduled to be held in Greenville on July 30.

The program will include a tour of an experimental field and conclude with talks on fertilization programs.

Stauffer Ups Eptam Output

Eptam, a new selective herbicide, is being moved into larger scale production by the Stauffer Chemical Co., New York. During the past year it has been made in pilot plant quantities.

Production now is being scaled up in a larger pilot unit to provide an adequate supply of the herbicide for the expanded field testing and development program the company plans to conduct both in the U.S. and selected foreign countries.



FOR DUST FORMULATORS ONLY

The leaf shown above is infested with aphids. These tiny sap-sucking insects seldom move more than a few inches a day. This sluggishness and their manner of feeding require the deposition of a contact insecticide on these hard-to-kill insects. Coverage of the entire plant surface is necessary for adequate control.

The characteristics of any dust reflect the quality of the diluent used. Most

dusts have less than 20% toxicant; the remainder is an inert diluent with which the toxicant must be in intimate contact for maximum effectiveness.

PYRAX ABB, the most compatible diluent with workable bulk density, imparts flow and anti-caking properties to dust mixes. **PYRAX ABB** promotes electrostatic dispersion of the dust cloud, assuring coverage of the entire plant surface.



R.T. VANDERBILT CO.

SPECIALTIES DEPARTMENT

230 PARK AVENUE, NEW YORK 17, N. Y.

USE

THIS

HANDY

COUPON

Please send ☐ Bulletin 23D ☐ Sample **PYRAX ABB**

NAME _____

POSITION _____

(please write on or attach to company letterhead)

Trace Mineral Use In Texas

Trace mineral fertilization may be a vital factor in the establishment of new forage crops in south Texas and the resultant increase in crop yield and quality can be of great importance to the cattle industry, according to scientists of the Southwest Agricultural Institute, San Antonio, Texas.

Studies, nursery tests, and actual field testing have been carried out by SAI in a fertilizer research program supported, in part, by the Calumet and Hecla, Inc., the Climax Molybdenum Co., and the American Zinc and Lead Smelting Co.

The application of phosphate to crops including soybeans, mung beans, guar, alfalfa, bur clover, milo, and sesbania consistently increased crop yields but the inclusion of the trace minerals of copper, molybdenum, and zinc increased the yields over and above that of phosphate fertilization alone.

On a test plot near Brownsville, for example, bur clover fertilized with phosphate alone yielded a fresh weight of 14,851 pounds to the acre; a fertilizer containing phosphate and molybdenum yielded a fresh weight of 15,920 pounds to the acre; whereas the use of phosphate, molybdenum, copper and zinc gave a yield of

17,963 pounds to the acre compared with 12,934 pounds per acre from unfertilized land.

Cyanamid Ag. Division

Test results reported by Dr. Castillo Graham and Dr. Elroy R. Krestensen, University of Maryland Field Station, Hancock, indicate new Sevin insecticide has provided outstanding control of the 17-year locust.

Dr. Graham and Dr. Krestensen recently published a scientific paper about cicada control tests they conducted in Washington County, Western Maryland. According to the two scientists, "Sevin gave 100% kill of cicadas caged on the limbs of trees for six days after treatment and remained highly effective for 10 days."

Joins Fulton's Chicago Staff

Robert E. Akins has been appointed to the Chicago textile sales staff of the Fulton Bag & Cotton Mills, Atlanta.

Mr. Akins has had more than fifteen years of experience purchasing fabrics and other items for manufacturing, wholesale and retail concerns in Chicago. He comes to Fulton from the International Furniture and the Karpen Furniture Divisions of the Schnadig Corporation, Chicago.

Largest Plant Food Shipment To Midwest

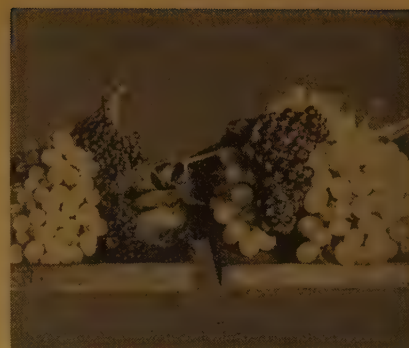
The Midwest this spring received the largest single-owner shipment of plant food ever to come up the Mississippi River.

About 10,000 tons of phosphate materials valued at almost half a million dollars was transported in an eight-berth tow shown here at Memphis. The tow left Baton Rouge in mid-March.

This record shipment by International Minerals & Chemical Corporation, Chicago, consisted of both triple-super phosphate and rock phosphate from its Bartow, Fla., operations.

The waterways shipment plan offers several advantages, according to IMC officials who said that the barge tow actually becomes a "floating warehouse" supply from which IMC salesmen distribute as it moves up the river. Major distribution points from the waterways are at Memphis, St. Louis, Peoria, Keithsburg, (Ill.), Minneapolis, and St. Paul.

The barges were loaded at Baton Rouge from ships and ocean-going barges which brought the materials across the Gulf of Mexico from Tampa.



Now Meet Grower Demand with GIBREL® Emulsifiable Concentrate

New Spray Formulation—

GIBREL Emulsifiable Concentrate is the newest Merck formulation developed especially for use in foliar sprays. It contains approximately 4 Gm. potassium gibberellate per quart (0.5% active ingredient on a weight-by-weight basis).

Economical and Easy to use—

Where a known level of treatment is needed, sprays containing GIBREL Emulsifiable Concentrate offer simplicity and economy of use. They are safe to handle, and nonphytotoxic. The Concentrate contains solvents, surfactants and expanders. It is immiscible in water and will not settle out in the spray tank, ensuring full and uniform treatment.

It may be used in aircraft and low-pressure ground spraying equipment. Suitable for use with other sprays, it is compatible with commonly used insecticides, fungicides and fertilizers.

SEND FOR MORE INFORMATION

Write, wire or phone your nearest Merck Sales Office for detailed information about GIBREL Emulsifiable Concentrate.

MERCK & CO., INC.

—Sales Offices in—

Rahway • Los Angeles
St. Louis • Atlanta • Boston
Chicago • Minneapolis
Philadelphia
San Francisco

MERCK presents latest results with GIBREL



A premium market awaits the magnificent clusters of high-quality Thompson Seedless and Black Corinth grapes resulting from a single spray of GIBREL. Although the large treated grapes at right were grown without costly girdling, they are nearly twice the size of those at left which were produced by using traditional practices.

GIBREL

Promises Higher Profits for Farmers Everywhere

The experience of California grape growers is a striking example of how GIBREL promises higher crop yields and greater profits for farmers all across the country.

Thompson Seedless and Black Corinth grapes of California are naturally small in size and yield. To market a profitable crop, growers have been compelled to employ such practices as girdling and bunch-pruning—effective but costly measures for increasing berry size and yield. Here's how GIBREL has changed the picture.

A single spray of this new growth stimulant eliminates the need for girdling, and produces a crop equal in berry size and yield to that obtained from traditional practices. Even more impressive, a heavier spray of GIBREL gives up to twice the size and yield with the same high quality (as judged by sugar and acid content), and a chance for growers to develop a premium market.

Many other crops respond to seed treatment or foliar

sprays of GIBREL. Its "vitamin-like" effect often triggers a plant's characteristic growth—promises such results as increased size and yield of many fruits and vegetables, earlier emergence for a better stand, shorter growing period, and faster early growth even in the face of adverse weather.

How practical is GIBREL for the crops you grow? Merck's extensive research program, including large-scale field trials on a wide variety of crops, is providing the answers right now. Check with your agricultural chemicals supplier for more information—and formulations of GIBREL tailored to your needs.

© Merck & Co., Inc. for its brand of gibberellin plant growth substance.



MERCK & CO., INC.
Rahway, New Jersey

GIBREL® —a product of MERCK

STOP SIFTING!



**PACK
POISONOUS
POWDERS
SAFELY
IN
DUOTITE
BAGS
BY
SHELLMAR-
BETNER**

You can't take chances when you're packaging poisonous powders. Sifting can be dangerous!

That's why you should use Duotite bags by Shellmar-Betner. Duotite bags are of rugged construction with or without special liners to meet your product specifications. They have double-folded bottoms secured by both heat seal and adhesive. They're durable, too — give strong resistance to breakage.

Duotite bags look neat and trim. And with Shellmar-Betner's expert printing they have plenty of sales appeal. Call on Shellmar-Betner for the best package for poisonous powders and other special chemical products.

CONTINENTAL © CAN COMPANY



SHELLMAR-BETNER DIVISION

DEVON, PENNSYLVANIA • MT. VERNON, OHIO • SOUTH GATE, CALIFORNIA

QUALITY PRINTERS AND CONVERTERS
OF FLEXIBLE PACKAGING MATERIALS

2nd DDT Factory In India

India's second DDT factory, at Alwaye (Kerala State), has begun trial production. The factory, which will have a capacity of 1,400 tons of technical DDT per year, is expected to attain full production shortly.

At the same time, the expansion program at the Delhi DDT factory, which has been in production for the last two years, is nearing completion. It also will have a capacity of 1,400 tons per year.

With the completion of the Alwaye factory and the doubling of the capacity of the Delhi factory, the country's current requirements of anti-malarial insecticides will be met from indigenous production. About 2,000 tons of insecticides other than DDT are being produced by private manufacturers. Total requirements are estimated at 5,000 tons per year. Both the Delhi factory and the Alwaye project are being managed by the Hindustan Insecticides (Private) Ltd., a government owned company under the Ministry of Commerce and Industry.

Du Pont School Grants

Grants totaling more than \$50,000 for applied research on agricultural applications of high-content nitrogen compounds have been awarded to 16 universities and colleges for 1958, it has been announced by Du Pont's Polychemicals Department.

The funds have been specifically allocated to schools with major agricultural research units that normally conduct extensive programs in the fields of turf and ornamentals fertilization, and animal feeds.

The grants are in addition to Du Pont's annual program of aid-to-education.

Danner Is Fulton Controller

Warren W. Danner has been appointed controller of the Fulton Bag & Cotton Mills, Atlanta.

In his new post Mr. Danner assumes controller responsibility for the mill division, bag division and corporate operations. He joined Fulton in 1956 as controller of the textile division. Since 1934 he has been associated with cotton mills in Georgia in

various engineering and accounting positions.

Poison Laws Revision

The seventh revision of the Compilation of Economic Poisons Laws has been published by the Chemical Specialties Manufacturers Assn., New York. The revision contains all laws enacted and regulations issued since the last revision and brings the compilation complete to Jan. 1, 1958.

A new index, tabulation of laws and lists of officials are included.

Campbell Aids Research

The Campbell Soup Co., Camden, N. J., has announced a 1958 aid-to-education program totalling \$254,500 to be contributed to 29 colleges and universities in the U. S.

Fellowships or grants for agricultural research and food technology have been established at Cornell University, Massachusetts Institute of Technology, North Dakota Agricultural College, Rutgers University, University of California and University of Wisconsin.

► **Ammoniators*** ► **Coolers** ► **Dryers**
► **Elevators**
► **Granulators***
► **Conveyors**

*TVA Licensed Manufacturer

**FOR THE
FERTILIZER
INDUSTRY**



Renneburg
Continuous
Combination
Ammoniator-Granulator

SAVES MONEY—Costs less to buy . . . costs less to operate • **SAVES TIME**—Ammoniation is going on at all times . . . no loss of time in charging or discharging • **SAVES SPACE** • **HIGHER RATE OF AMMONIATION** • **FLEXIBLE**—any retention time can be acquired . . . speed of rotation and bed depth can be easily increased or decreased.

Renneburg
DehydrO-Mat
Dryer



Built in a wide range of sizes, the DehydrO-Mat Dryer, though comparable in price, out-performs conventional dryers of similar volume. Compact, it is easy to install in a minimum of space. The varying diameter cylinder regulates air and material velocities . . . controls temperature drop and product retention time . . . assures gentle drying.

Other chemical and fertilizer processing equipment manufactured by Renneburg includes: • Ammoniators • Granulators • Dryer Furnaces • Complete Air Handling Systems • Pilot Plants • DehydrO-Mat Combination Dryers and Coolers

Write for Free Informative bulletin: "Renneburg Continuous Granular Fertilizer Equipment" 

Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

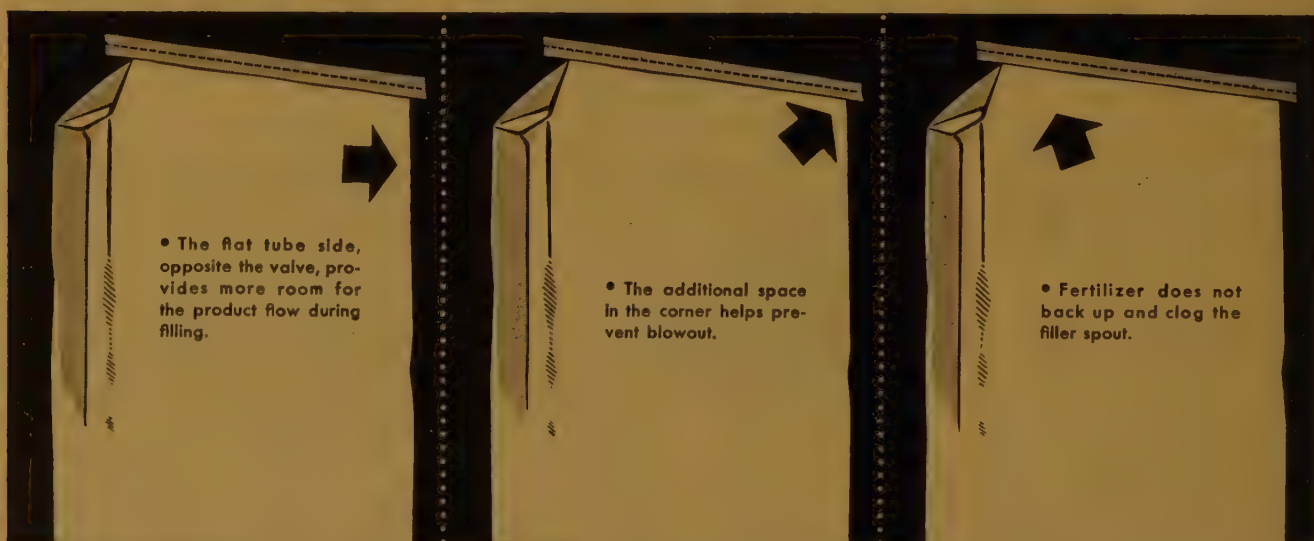
Pioneers in the Manufacture and Development of Processing Equipment for over 80 years.

ANOTHER BEMIS MULTIWALL FIRST...

ANOTHER IMPORTANT BONUS FOR YOU...

Bemis Single-Gusset Sewn-Valve Multiwalls

The new Bemis Single-Gusset Sewn-Valve Multiwall will improve your packing performance, *because*



And there is a good chance this new Bemis Multiwall will cost you less, too. The additional usable space created by the flat tube corner often permits the use of a shorter bag, which would save you money. Your Bemis Man will check this possibility with you.

Bemis Single-Gusset Multiwalls Stack Perfectly, Too

You can palletize Bemis Single-Gusset Multiwalls easily and firmly . . . and pile them three pallet loads high, if you wish. They square up well. In fact, you have to look rather closely at stacked bags in the warehouse to determine whether they are single-gusset or two-gusset types.

General Offices—408 Pine Street, St. Louis 2 • Sales Offices in Principal Cities



AGRICULTURAL CHEMICALS

Top Honors For Pfizer Poster

Edward Bergelt, (right), director of advertising, Agricultural Sales Division, Charles Pfizer & Co., Brooklyn, receives first prize from Lou Ingwerson, chairman, Exhibit Committee, Art Directors Club of Chicago, at Annual Outdoor Art Awards Luncheon in Chicago.

The Vigofac poster illustrated in the photo at right won first place in the Agricultural Classification at the Annual



Competition and Exhibit of Outdoor Advertising Art, sponsored by the Art Directors Club of Chicago.

To Build In Holland

The Albatros Superphosphate Factories of Vlaardingen, Holland, have awarded an engineering contract to the D. M. Weatherly Co., Atlanta, Ga., for a nitrophosphate plant.

The plant will be built in Vlaardingen and will be the first plant in Holland to utilize the T.V.A. continuous rotary ammoniator for the production of nitrophosphate. The plant will also produce fertilizer containing 50 per cent water soluble and 50 per cent citrate soluble phosphates.

OK Amino Triazole In Corn

Corn belt farmers this spring are being permitted to use the herbicide, Amino Triazole, a short time before planting on fields to be sown in corn, to control Canada thistle. Last year this could not be done.

Since then, the Food and Drug Administration has cleared the herbicide for this use. The government acted on the basis of report; from university, government, and industry research stations that showed that the chemical did not affect corn when sprayed on fields during the pre-planting period. Canada thistle causes losses of several hundred million dollars in corn growing states.

CORRECTION

A news item in the March issue of *Agricultural Chemicals* reported that the new Amsco Hot Shot Insect Killer aerosol is a product of the American Mineral Spirits Co., Murray Hill, N.J. The insecticide actually is manufactured by the Amsco Chemical Co., Memphis, Tenn.

Amsco Chemical, a recently formed concern, is a subsidiary of the American Snuff Co., Memphis. The company produces a line of aerosol insecticides, a line of "F" style-stacking cans, and a line of pint and quart insecticides in glass containers.

Is your carrier this good? *

Exceptionally low moisture content and pH of 5 for highest compatibility with malathion, methyl parathion, ethyl parathion or other phosphated insecticides . . .
* it is, when you use Pikes Peak Clay.

Same carrier for both organic phosphates and hydrocarbons (one product to purchase, one product to store and one product to use . . . * it is, when you use Pikes Peak Clay.

Ground to 95% through a 325 mesh . . . * it is, when you use Pikes Peak Clay.

High absorbency, less hygroscopic and unmatched flowability, all in one carrier . . . * it is, when you use Pikes Peak Clay.

A carrier that protects the stability of your finished product or concentrate . . . * it is, when you use Pikes Peak Clay.

Perfect carrier for concentrates. Perfect, too for adjusting bulk density or fluffing field strength dusts . . . * it is, when you use Pikes Peak Clay.

Write today or call GRaceland 7-3071 in Chicago to find out more about Pikes Peak Clay and obtain samples for testing.

G R C

GENERAL REDUCTION COMPANY

1820 ROSCOE STREET • CHICAGO 13, ILLINOIS

For insecticide formulators

...trained
personnel from
American Cyanamid
Company, developers
of malathion and
parathion, help
you produce and
sell phosphate
formulations.



IN THE FIELD — Cyanamid's Field Personnel includes 5 entomologists and more than 60 technical salesmen. All have technical education and a high degree of practical experience. They are on call across the country to consult with you and work with your technical and sales force on all aspects of field use of phosphate insecticides whether new or established uses. These men will be glad to help you arrange local programs with extension people, dealers or growers.



IN YOUR PLANT—

Cyanamid makes available to you, *at your plant*, its years of experience in plant hygiene and insecticide formulating. For expert, personal assistance in solving formulation, packaging or hygiene problems, write or call American Cyanamid Company.

MARKETING ASSISTANCE — In addition to on-the-spot sales and technical help, these other Cyanamid activities make your insecticide sales job easier: Major advertising to the

farm and garden markets; market investigation and development of new uses; product labeling and analysis; safety programs; and field demonstrations.

CYANAMID

AMERICAN CYANAMID COMPANY • AGRICULTURAL DIVISION • 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
IN CANADA: CYANAMID OF CANADA, LIMITED, 160 BLOOR STREET EAST, TORONTO

BREVITIES

KERMANS SHAH, a provincial capital in western Iran, is planning to build a chemical fertilizer plant with a capacity of 100-200 metric tons per day. The Kermanshas Chamber of Commerce is interested in information and estimates from US construction firms.

AC

THE IOWA FERTILIZER COUNCIL, a college-industry fertilizer advisory group, recently was formed by representatives of the fertilizer industry, the Iowa Department of Agriculture, and Iowa State College. John Pesek, Iowa Plant Food Co., Des Moines, is chairman of the council.

AC

THE AMERICAN POTASH & Chemical Corp., Los Angeles, has opened a south-central district sales office at Shreveport, La. William W. Young has been named district sales manager of the branch, located at 1600 Fairfield Ave., Shreveport.

AC

THE AGRICULTURAL EXTENSION SERVICE, State College of Washington, Pullman, has published a chart outlining the preparation of fungicides and insecticides in small amounts for home gardens and orchards.

AC

NIAGARA BRAND SPRAY CO., Ltd., division of Food Machinery & Chemicals, Ltd., of Burlington, Ontario, has changed its name to Niagara Brand Chemicals.

AC

THE FERTILIZER SOCIETY (England) was presented with a silver salver in honor of its 10th anniversary from the Danish Fertilizer Industry at a dinner in London, Feb. 27. Principal guest speakers at the dinner were Sir Alexander Fleck, chairman of Imperial Chemical Industries Ltd., London, and Sir Wil-

liam Ogg, director of the Rothamsted Experimental Station.

AC

WALTER S. McNUTT has been appointed to the staff of the Connecticut Agricultural Experiment Sta-

tion. Dr. McNutt will conduct research on the bio-chemistry of environmental effects on plants.

AC

LOUIS H. WILSON, secretary and director of information of the National Plant Food Institute, has been elected an honorary vice president of the American Forestry Association.

AC

PAUL J. LA MARCHE has been made director of production for the U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corp., New York.

GLENDON — at Glendon, N. C.



Offering:

INSECTICIDE GRADE PYROPHYLLITE

- ph 6 to 7
- 30 lbs. per cu. ft.
- avg. particle size below 5 microns
- non-alkaline
- chemically inert
- 92-95% passes a 325 mesh screen
- non-hygroscopic

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly minimizing drift, waste of materials, etc.

GLENDON PYROPHYLLITE COMPANY

P.O. Box 2414
Greensboro, N. C.

Plant and Mines
Glendon, N. C.

Win a 2-Year Subscription to Ag Chem by Entering AC's

GIANT SCRAMBLE CONTEST

*25 Grand Prizes
of Two-Year Subscriptions*

*975 Consolation Prizes
of One-Year Subscriptions*

Deadline for Entries: Midnight, December 31, 1975

Just follow the simple instructions listed below to win a subscription to the leading magazine in the agricultural chemical field.

All entries in AC's giant scramble contest will be judged by impartial members of the circulation department.

Members of the AC staff, relatives, friends, advertising agencies, advertisers, and all others are fully eligible.

A G L R E
C L A M I R
L S A H U
C U I T C

(Hint: The letters spell the name of the leading magazine in the agricultural chemicals field.)

Agricultural Chemicals		Box 31, Caldwell, N. J.	
My answer to the puzzle is below. Send me my prize.			
2 yrs. \$5	1 yr. \$3	Puzzle too hard ☐	
☐	☐	Need another hint	
The contest looks phony but send a subscription anyway.			
Name			
Company			
Street			
City		Zone	State
Scrambled letters spell			

Rules

1. Unscramble the letters above.
2. Write answer on coupon at right.
3. Fill out remainder of coupon.
4. Enclose \$5 to be eligible for Grand Prize of a two year subscription or \$3 to be eligible for consolation prize of a one year subscription.
5. Mail.
6. Go tell your friends about the contest and your good fortune.
7. Reap the benefits of being an AC subscriber.

THE NATIONAL SAFETY COUNCIL has announced that Coronet Phosphate Co., Plant City, Fla., a division of Smith-Douglas Co., Inc., Norfolk, Va., has been named first place winner for 1957 in the Safety Council's Division 4 Fertilizer Section.

AC

RAYMOND R. HULL has been appointed vice president of Dixon Chemical & Research, Inc., Clifton, N. J.; vice president of Dixon Chemical Industries, Inc.; and general manager of the I. P. Thomas Division of Dixon Chemical Industries, Inc. Mr. Hull formerly was general manager of the I. P. Thomas Division when it was owned by Pennsalt Chemicals Corporation.

AC

ARCHIE E. ALBRIGHT, assistant to the president, Stauffer Chemical Co., New York, has been elected a vice-president of the company.

AC

THE WILMINGTON, N. C. plant of the Smith-Douglass Co., Norfolk, Va., recently was cited as the safest plant among all Smith-Douglass fertilizer plants.

AC

WALTER N. SAABY, director of traffic, Victor Chemical Works, Chicago, has been elected president of the Traffic Club of Chicago. Eugene Landis, director of transportation for the International Minerals & Chemical Corp., Chicago, is second vice president of the organization.

AC

L. H. MANDERSTAM AND PARTNERS Ltd., London, has been awarded the contract for the rebuilding of a potash plant at the North end of the Dead Sea, destroyed in 1948. The Arab Potash Co., Amman, Jordan, placed the contract.

AC

THE GARDEN SUPPLY MERCHANTISER has moved its offices to 8633 Loch Raven Boulevard, Towson, Maryland.

AC

KELLY-WESTERN SEED DIVISION, Salt Lake City, manufacturers of PAX Crabgrass and Soil Pest Control and other garden products, recently hosted more than 200 garden dealers

from the Intermountain area at the company's first dealer show.

AC

WILLIAM M. STILWELL has been named manager of agricultural sales and development by the Climax Molybdenum Co., New York, a division of American Metal Climax, Inc.

AC

THE INTERNATIONAL MINERALS & CHEMICAL CORP., Chicago, has an-

nounced the appointment of Richard V. Falck as district sales manager in the special products department of its Phosphate Chemicals Division, with headquarters in Arlington, Texas.

AC

JACK GLENN has been appointed to the national sales promotion staff for PAX Crabgrass and Soil Pest Control, a product of the Kelly-Western Seed division of Utah Cooperative Assn., Salt Lake City.

Formulate your way to greater profits with

Terraclor
THE NEW SOIL FUNGICIDE

Terraclor has been field tested for seven years and has proved its effectiveness for the control of soil-borne diseases of the following crops:

COTTON:	Rhizoc Damping-Off or "Soreshin"
CABBAGE, CAULIFLOWER, ETC.:	Club Root and Black Root or Wire Stem
TOMATOES, PEPPERS:	Southern Blight
BEANS:	Root and Stem Rot, Sclerotinia White Mold
PEANUTS:	Southern Blight (Southern Stem Rot)
POTATOES:	Scab, Rhizoctonia
LETTUCE:	Leaf Drop, Bottom Rot, Botrytis
ALFALFA, CLOVER:	Crown Rot
WHEAT SEED:	Common Smut or Bunt
GARLIC:	White Rot

TERRACLOR® is a trademark

Dry formulations are free-flowing and have a fine particle size. Terraclor has good storage properties and is compatible with most other pesticides.

Write for information.



OLIN MATHIESON CHEMICAL CORPORATION
INSECTICIDE PRODUCTS DEPARTMENT • BALTIMORE 3, MD.

Fresno, Calif. • New York, N. Y. • East Point, Ga. • Denver, Colo.

Chicago, Ill. • Houston, Tex.

6139-A

Equipment, Supplies, Bulletins

New Equipment For Densifying Fine Powdered Materials

A NEW method and new equipment for de-aerating and compacting, or densifying, fine powdered materials have been developed and patented (Patent 2,806,711) by J. M. Huber Corp., Borger, Texas. According to Huber, the densifier makes possible the production of less dusty products with a uniformly higher density, and affords a positive way of reducing packaging materials and transportation costs.

The densifier is designed so that finished density may be readily varied and reliably controlled at any level up to the maximum that can be achieved with the material involved.

Of special interest to manufacturers who are producing fluffy fine powders with low bulk density, it was originally developed by Huber to reduce the bulk and improve the packaging of one of their finely divided pigments.

This equipment has all the advantages of a continuous process, including low power requirements and a minimum of operating supervision. The process removes entrained or occluded air from fine, loose, powdered materials by the simultaneous application of vacuum filtration and mechanical compression to a regulated

and continuously moving product stream. Density control is reliable and simple; vacuum requirements are surprisingly low.

It has been used for tonnage production of materials such as kaolin clays, 75% DDT concentrates, metallic oxides and silica pigments. In actual commercial practice, the density of these materials has been increased as much as 100-200%.

Manufacture and use will be licensed by Huber to any company interested. Huber also offers a pilot densifier for processing sample materials for study and evaluation by those interested in the process.

Pyrethrum Facts Booklet

African Pyrethrum Development, Inc., New York, has issued the 1958 edition of Pyrethrum Facts, the third annual edition. The booklet reviews progress of pest control and the improvement of processes, controls, and applications of pyrethrum.

Cotton Pest Control Guides

The National Cotton Council of America, Memphis, Tenn., has published a booklet of cotton pest control guides for 1958. The publication includes a summary of 1958 cotton insect control recommendations by states, precautions for handlers and users of insecticides, and guides for applying insecticides.

In addition, it contains information on principal insecticides and miticides, 1958 guides and materials for chemical weed control in cotton and 1958 cotton defoliation guides. A summary of state-by-state recommendations for chemical treatment of cotton planting seed also is included. The booklet is available from the National Cotton Council at 20 cents per copy.

S. C. Fertilizer Folder

Circular 437, Fertilizer Recommendations for South Carolina, is being distributed by the Clemson Extension Service, Clemson, S. C.

Recommendations are given for the field crops, vegetable crops, and fruit crops commonly grown in the state. The recommendations cover the amounts of nitrogen, phosphorous, and potassium and the minimum grades and pounds of mixed fertilizers to apply per acre for the respective crops and soil conditions. Brief statements on such matters as time and method of application and other pertinent information on the use of fertilizers is given for each crop.

Yale Develops 30 Foot Lift

The Yale & Towne Manufacturing Co., Philadelphia, has developed lift truck channels applicable to a 10,000 pound capacity Yale gasoline truck which can raise a 4000 pound load to a height of 30 feet for specialized handling jobs and maintenance work.

Designed by the company's engineering department, the extra high channels have an overall collapsed height of 220 inches and are similar in appearance and basic operation to standard Yale roller channels operating with a simplex lifting cylinder.

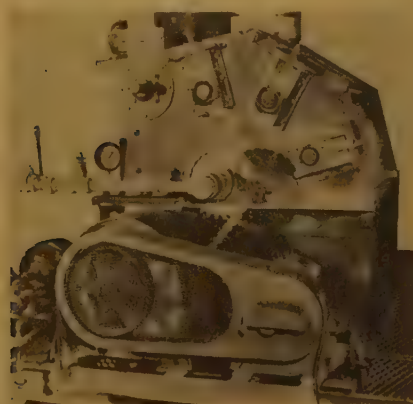
The great overall height permits a wide spacing of channel rollers and effective channel bracing in order to achieve load rigidity throughout the full range of lift.

Despite the great distance travelled, lifting speeds of 20 feet per minute loaded and 21 feet per minute empty are possible. Lowering speeds are 31 feet per minute loaded and 30 feet per minute empty.

Spark-Proof Fork Trucks

Certain gas-powered fork trucks produced by Industrial Truck Division of Clark Equipment Co., Battle Creek, Mich., are now available with a special type of construction which prevents or reduces the possibility of sparks from the truck causing a fire hazard.

The special type of construction is called "GS construction" (gas



What we can do for you—

IN THE FIELD OF FERTILIZERS, INSECTICIDES, OR MATERIALS HANDLING



For 19 years we have followed the white line on just one road—solving engineering production and cost problems in the mixing, grinding and blending of almost any chemical. Pharmaceutical to pesticides. Elevating to bagging. This experience isn't worth anything to us or to you—unless you have a problem, or maybe you have a question to ask. We would like to get acquainted with you—just drop me a line or telephone. Talking is a pleasure and no obligation.

Al Poulsen

We design and build complete plants



Insecticide plant in California—This is one of the many complete plants in this country and in South America built by the Poulsen Company.

If you want to redesign or relocate

There are lots of new ideas in the chemical mixing field. We can help you redesign or relocate to save space, to secure labor economy, to secure more flexibility, and to reduce other costs. Please ask us for specific examples.

If you need specially designed equipment

You have a special problem. Perhaps you have had it for some time, and this problem requires a special something-or-other to solve it. Tell us the problem. There always seems to be a solution.



U.S. PAT. NO. 2,591,721

IF YOU MIX, GRIND, OR BLEND—

*R.T.R.** Uni-Blender
solves many problems

That's what you want—a plant that's *Ready-To-Run—not a plant that requires long engineering, many components from many places, with unknown and untested installation and operating problems.

The Poulsen Uni-Blender is our standard unit. It does almost everything but wind the clock. It mixes, elevates, grinds, and bags. Impregnates liquids with diluent mixes.

If your product deteriorates from long delays in shipping, you want to deliver a *fresh* product...the Uni-Blender can do it!

If you want to blend concentrate to field strength...if you would like to switch from custom-mixed to standard...Uni-Blender can do it!

This unit can handle six to eight, 1200 to 1500 lb. batches of field strength dust per hour. Other capacities are available.

Requires only 9' by 12' floor space and 16' headroom. Factory pre-tested and ready to go to work for you just two days after delivery. Let's talk about it.



Engineers and manufacturers
of materials processing
and materials handling equipment

2341 East 8th Street
Los Angeles 21, California

GENTLEMEN: Please send me your technical bulletin about the standard unit Uni-Blender.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

spark-enclosed). It provides additional protective features to the electrical system, fuel system and muffler.

GS-type fork trucks are said to be particularly suited—and in some cases are required—for handling flammable materials or for operation in areas where atmospheric conditions present a fire hazard.

Georgia Fertilizer Folders

The Agricultural Extension Service of the University of Georgia College of Agriculture has published two fertilizer circulars, "Mixed Fertilizer—What Is It" and "Georgia's \$400,000,000 Farm Fertility Program." The folders were written by P. J. Bergeaux and Ralph L. Wehunt, extension agronomists.

Mine Safety Bulletin

A new low-cost, general purpose instrument for the measurement of size distribution of small particles is described in a booklet issued by the Mine Safety Appliances Co., Pittsburgh, Pa.

Soil Fungicide Folders

Advice on use and benefits of soil fungicides is offered in three new pieces of literature just issued by the Insecticide Products Department of Olin Mathieson Chemical Corp., New York.

Two of the six-page folders, describe the use of Terraclor, on vegetables and crucifers. The third is a technical application bulletin for the treatment of damping-off or "sore-shin" on cotton.

Copies of the pamphlets may be obtained by writing to the Insecticide Products Department, Olin Mathieson Chemical Corporation, 10 Light St., Baltimore 3, Md.

Silage Preservation Folder

The Virginia Smelting Co., West Norfolk, Va., has published a folder describing an economical method of preserving forage in silos for animal feed.

Printed to instruct farmers in the use of Virginia Smelting's new sodium metabisulfite preservative, Sil-Aid, the folder outlines how all types

of unwilted forage can be ensiled and given maximum protection against spoilage and loss of nutrients.

New Fork Truck Line

A new line of electric-powered, stand-up, center-control fork trucks, with capacities from 4000 to 10,000 lbs., is being offered by the Elwell-Parker Electric Co., Cleveland.

Five models are available with capacities of 4000, 6000, 7000, 8000 and 10,000 lbs. All models feature front-wheel drive and rear-wheel steer for maximum maneuverability.

New Uramite Formulation

A new formulation of Uramite fertilizer compound—Uramite M—designed specifically for blending into mixed fertilizers, is now being introduced commercially by the polychemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del.

The company said that "Uramite" M, which can be used in either the dry mixing or ammoniation processes, has these advantages as an ingredient in mixed fertilizers: it provides plants—turfgrass, flowers, shrubs, and other ornamentals—with a continuous, uniform supply of nitrogen; its high content of gradually released nitrogen offers more concentrated and safer mixtures; it is a free-flowing material that blends well with other ingredients to form a high quality mixed fertilizer; it is manufactured in a particle-size designed for specialty mixes; and application costs are reduced with this high nitrogen content ingredient, since fewer applications are required.

Merck Gibrel Concentrate

Merck & Co., Rahway, N. J., has announced a new Gibrel concentrate specially formulated for aerosol packaging. The company points out that the improved formulation offers; lower handling costs because of increased concentration, improved keeping qualities because it is essentially non-corrosive, and additional plant claims.

A technical bulletin, describing the new formulation and listing suggested label data and additional plant uses for the material is available from the company.

IT'S HERE - IT'S PROVEN

ITS Y-M CO'S. 500 LB. PORTABLE
CUT-BACK DUST BLENDING SYSTEM

Capacity — Four to six 500 lb.
batches per hour

Space Requirement —
6' 4" x 10' 6" x 15' O. A. Ht.

DELIVERED TO YOU—READY TO OPERATE
System Includes — Dust hood at
loading station; Sifter; Pre-Mixer
at floor level; Pneumatic Conveyor-
Blender; After-Mixer with dust col-
lector; Dust hood at packaging sta-
tion, etc; All motors wired to panel
box with push button controls.



WRITE OR PHONE
YOUNG MACHINERY CO.
MUNCY, PA. TODAY!



Muncy, Pennsylvania	-	-	-	6-3165
Pasadena 8, Cal.	-	-	-	RYan 1-9373
Oakland 13, Cal.	-	-	-	TEmplebar 2-5391

Export Sales Reps.:

Mercantile Development, Inc.

60 E. 42nd St., New York 17

Murray Hill 7-1424

Merck Technical Service

The Chemical division of Merck & Co., Inc., Rahway, N. J., has prepared technical service sheets on the use of Gibrel on cotton as a seed treatment and a foliar spray. Gibrel is Merck's trademark for its brand of gibberellin plant growth substance.

Merck has designed two formulations for use on cotton. They are; Gibrel Seed Stimulant 88 and Gibrel Emulsifiable Concentrate. The seed treatment is said to encourage early emergence and faster early growth. The effects of foliar spray include improved boll set and increased boll-holding capacity after "cut-out."

Vibratory Screen Catalog

Syntron Co., Homer City, Pa., is offering a new catalog on Syntron vibrating screens. The 14-page booklet lists complete data and specifications on pulsating-magnetic screens, concentric-action screens, unbalanced-pulley screens, grizzly bar screens, and screening feeders.

Dry Powder Blower

A dry powder blower is being marketed in England by Newton Chambers and Co., Ltd., Thorncliffe, for use with their Zaldecide insecticidal powders. The blower is easily portable and simple in operation.

When full, it weighs 18 pounds and it will disseminate seven pounds of insecticide powder in three minutes.

New Du Pont Herbicide

E. I. du Pont de Nemours & Co., Wilmington, Del., has announced that Tryben 200 weed killer can eliminate bindweed, Canada thistle, trumpet vine, and many other broad-leaved perennials for a year or longer by one spraying.

The new chemical is said to be the first really effective control for many species of weeds and woody vines. Tryben is based on the dimethylamine salt of trichlorobenzoic acid and contains two pounds of acid equivalent per gallon. It is effective through both contact and residual action.

Tryben 200 weed killer is non-selective and is formulated as a liquid to be diluted with water for spray application. Total spray volume needed per acre depends on the density and height of growth to be treated. Du Pont reports that many successful trials of the herbicide have been made in widely scattered states, including Kansas, Nebraska, North and South Dakota, Minnesota, Texas, California, Oregon, Colorado, Iowa, Montana, Missouri, and Wyoming.

Acetylene Homolog Available

Volume production of methylacetylene-propadiene has been started by the Dow Chemical Co., Midland, Mich. This is the first time the product has been available in commercial quantities, according to Dow Chemical Co.

Fields in which methylacetylene-propadiene may find use include synthetic rubber, textiles, agricultural herbicides, pharmaceuticals and plastics.

Barden Clay Quiz



DO YOUR WETTABLE POWDERS HAVE MAXIMUM SUSPENSION?

Everyone knows Barden's outstanding superiority in suspension: it's a "must" in preparing wettable powders. Barden is the industry's kaolin standard for a carrier-diluent in wettables and dusts; for an anti-caking conditioner in prilled fertilizers, and 93-94 percent sulfur.

These Barden features make it superior for all formulations: lowest abrasion...better sticking...high bulking value...greater uniformity...better deposits...maximum economy...superior wettables.

Working samples on request.

J. M. HUBER CORPORATION
100 Park Ave., New York 17, N. Y.



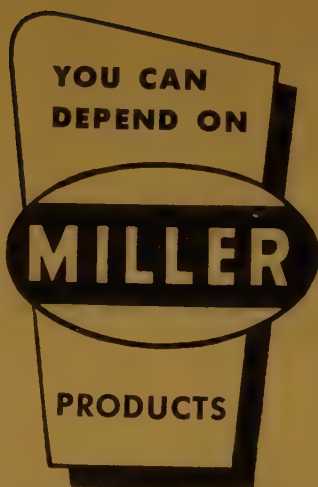
Wise owls read Huber Technical Data. Ask to be put on our mailing list.

FOR DUST OR SPRAY USE BARDEN CLAY

The Low-Cost Scientific Diluent



Interested in 75% Wettables and Concentrates? Zeolex 7A is the new synthesized carrier for top results. It's versatile, too: serves as a bulking agent, and as a static-free conditioner for 99 percent sulfur grinding. Write for more information.



MILLER "658" FUNGICIDE AGAIN AVAILABLE!

(Formerly CRAG Fungicide "658")

Thoroughly tested copper-zinc-chromate complex that has provided excellent results for growers and in agricultural experimental stations.

- Controls diseases on POTATOES, TOMATOES, CUCURBITS, PEANUTS, CITRUS, AVOCADOS, AZALEAS and TURF
- Supplies needed Trace Elements — improves vegetable quality
- Safe to use . . . no residue tolerance restrictions on harvested crops
- Sticks better as spray or dust
- Economical . . . does not break down in storage

NUTRI-LEAF "60" Soluble Fertilizer!

Safe, easy nourishment for plants. Feeds quickly . . . can be mixed with insecticides and fungicides. 20-20-20 analysis with trace elements and a sticker-spreader. Also a hormone to increase root growth and promote setting.

40% TEPP INSECTICIDE (KILMITE 40)

The most potent phosphate insecticide widely used against a great variety of insects. Can be safely used without dangerous residue to crops within 72 hours of harvest.

- Kills mites that are resistant to other phosphates
- Provides outstanding control of aphid, cabbage worms, etc.

TOMATO-SET HORMONE SPRAY

Increases the set, fruit size and yields of early tomatoes. Can be applied with your regular insecticide and fungicide programs.

- Can be applied as overall spray.
- Insures good crop during period when weather is unfavorable for fruit setting. Spray when blossoms are opening.
- Effectiveness demonstrated by three years of research work.

WRITE FOR INFORMATION AND NAME OF NEAREST SUPPLIER



**CHEMICAL AND
FERTILIZER CORP.**

2226 N. Howard Street
Baltimore, Maryland

New Trailer Applicator

General Metals, Inc., Greensboro, N. C., is offering a trailer applicator, Model TPD-200, designed for top-dressing of nitrogen solutions or complete liquid fertilizers.

The applicator consists of a heavy-duty trailer, large aluminum tank, metering pump, and all-steel boom. Solutions can be applied on 150 to 200 acres per day with the applicator which is said to be ideal for fertilizing pastures, small grain, or row crops.

Pesticide-Fertilizer Folder

An eight page brochure published recently by the Velsicol Chemical Corp., Chicago, describes methods of applying fertilizer mixed with Heptachlor insecticide. Broadcasting, banding in the row, side dressing, liquid application, double banding, and drilling with seed are discussed in detail.

The subject is treated in an educational, rather than a commercial way, so that copies of the brochure can be used both as an aid to farmers and as supplemental material in classrooms.

Plastic and Steel Container

A new plastic and steel returnable container for the shipment of corrosive chemicals is being produced and marketed jointly by the Container Division of Jones & Laughlin Steel Corp., Pittsburgh, and the Plax Corp., Bloomfield, Conn.

The container, tradenamed JAL-boy, consists of a polyethylene inner container with a steel drum outer jacket. It is being made in two sizes; standard weight 14-gallon, and a heavy duty 13-gallon size.

To Make Oliver Pumps

Dorr-Oliver, Inc., Stamford, Conn., has licensed the Milton Roy Co., Philadelphia, to manufacture and market small and miniature designs of the Oliver Diaphragm Slurry Pump.

Under the license Milton Roy Co. will have exclusive rights for the production of ODS pumps in sizes to approximately two gallons per minute.

AGRICULTURAL CHEMICALS

EDWIN S. VALLIANT, president of E. S. Valliant & Sons Fertilizer Co., Easton, Md., died last month.

AC

E. C. WHITMORE has been appointed to the newly-created position of director of product planning for the Bemis Bro. Bag Co., St. Louis. Mr. Whitmore maintains headquarters in Boston.

EDITORIAL

(From Page 31)

blast. Synthetic capacity is in the neighborhood of one million, two hundred thousand tons. Domestic consumption of less than a million tons is obviously far below the production of which the industry is capable, and normally more than half the country's output must be exported. Even with the steel mills operating at a sharply curtailed rate, there should be ample ammonium sulphate to take care of normal demand from the fertilizer industry, although producers who may have committed themselves heavily on material for export might face a tight situation temporarily. If by-product producers and others had realized that steel production was going to continue at a reduced rate over so long a period, obviously they would not have committed so much of their tonnage for export, which they felt that they had to do for protection.

The situation has been aggravated, of course, by the perennial problem of late commitments. Everyone from the fertilizer manufacturer buying his tons of raw materials down to the back yard gardener with his two ten-pound bags of 10-10-10 seems wedded to the policy of waiting until the last minute to decide what and when to buy — then is unhappy when he discovers that there just isn't enough storage space nor enough transportation in the country to make it possible for his order to be filled immediately.

The fertilizer industry, like no other industry, faces the continuing necessity of hammering away at a "Buy Early" program. This season, we can well imagine, with the late spring, the unusually wet weather and the piling up of demand into a few

hectic weeks, the situation is going to be worse than it ever has been before — on ammonium sulphate and a lot of other fertilizer raw materials and finished fertilizers as well.

DYRENE

(From Page 43)

and late blight on tomatoes and potatoes, and anthracnose, septoria leaf spot and gray leaf spot on tomatoes. In addition to the fungicidal effectiveness, other advantages claimed for this product are that: (1) it does not harm the foliage of tomatoes and potatoes, and in the case of tomatoes, the use of Dyrene results in a smooth finish, high-color crop; (2) it does not affect the flavor or odor of treated crops, and leaves no harmful residue.

Toxicity tests indicate a low oral toxicity (LD₅₀ for female rats was 2,710 mg/kg; on rabbits, the LD₅₀ was 460 mg/kg.). In chronic feeding tests on rats, there was no evidence after two years that a concentration of 5,000 ppm in the diet was harmful. There is some evidence, however, that long contact with the compound may cause skin irritation, and preventive precautions should be taken.

THODAN

Chemically, Thiodan is hexachloro-hexahydro-methano-2,4,3-benzodioxathiepin oxide. Currently Thiodan is being produced in the following formulations: Thiodan emulsifiable concentrate containing 24% technical material or 2 pounds per gallon, and several dust combinations containing 4% active ingredient. A 25% Thiodan wettable powder is available for research and experimental workers.

Thiodan can be described as a broad spectrum insecticide, particularly effective as an aphicide. Thiodan has proved very effective in controlling insects on potatoes, shade tobacco and seed alfalfa.

Niagara Thiodan is an insecticide discovered in the laboratories of Farbwerke Hoechst A. G., Frankfurt,

it's...

**magnesia
for
greater
yields**

Year after year Berkshire's EMJEO* (80-82% Magnesium Sulphate) and Calcined Brucite (fertilizer grade) 65% MgO have proved to be invaluable primary plant foods—together with nitrogen, phosphorous, and potash.

it's...

**BERKSHIRE
for
highest
quality
magnesia**

Be sure to include Berkshire's EMJEO and/or Calcined Brucite (fertilizer grade) 65% MgO in your mixtures as sources of available magnesium. You'll be glad you did.

it's...

**and
BERKSHIRE'S
POTNIT***

(94/95% Nitrate of Potash) for special mixtures and soluble fertilizers.

*Trademarks Reg. U.S. Pat. Off.

**Berkshire
Chemicals**
INC.

420 Lexington Ave.,
New York 17, N. Y.

Sales Offices: New York
Chicago • Philadelphia
Cleveland • Boston • Pittsburgh
San Francisco

Now...KLM offers



DAILY ALL CARGO FLIGHTS FROM NEW YORK TO EUROPE

AND BEYOND

SEE YOUR CARGO AGENT, FORWARDER
or any KLM office for information and
rates on your particular commodity.
KLM Royal Dutch Airlines, 430 Park
Avenue, New York 22, N. Y.

***Air Cargo Leader to Europe, the Near,
Middle and Far East, and South Africa***



**EXPERTS
WITH
EXPORTS**

Germany. Food Machinery and Chemical Corp. (Niagara Chemical Division) is licensed to manufacture, develop and sell Thiodan in the U. S.

Recommendations

Thiodan registrations are currently on a "no residue" basis, pending completion of toxicological studies.

Current registered label recommendations are for use of Thiodan emulsifiable concentrate at the rate of 1 to 2 quarts per acre for the control of Colorado potato beetle, flea beetle, leafhoppers and aphids.

Thiodan emulsifiable concentrate is federally registered for use on seed alfalfa crops for the control of lygus bugs and aphids where it has proved highly effective. Applications are made at pre-bloom or start of bloom period. The rate of application is 3 to 4 quarts per 10 gallons of water per acre as an airplane application. Due to the "no residue" basis, forage of treated crops cannot be fed to animals. This use is most important in western alfalfa seed producing areas where forage is not normally consumed as feed.

Thiodan emulsifiable concentrate also has been federally registered for use in California to control consperse stink bugs on pears. The application is to the orchard floor at pre-bloom.

On shade tobacco in the Southeastern states, Thiodan is approved for use as a 4% dust to control aphids, budworm, hornworm and cabbage looper. In combination with zineb, the mixture also controls blue mold. Thiodan treatments have resulted in no adverse effects on flavor or grade of treated tobacco.

Field Testing

Thiodan has been under a wide field testing program for several years. Testing will continue in areas of activity where tests indicate the material is effective. A brochure on Thiodan is available from the Niagara Chemical Division, Research Department, Middleport, New York; Richmond, California and Jackson, Mississippi.

Future Uses

A wide range of uses for Thiodan is in prospect including its use

on cotton, vegetable crops, deciduous fruits and forage crops.

Toxicology

Thiodan can be classified as a "moderately toxic" compound.

Commercial Availability

Thiodan formulations are now available and being marketed for its registered uses by Niagara Chemical Division, GLF Soil Building Service, and various regional pesticide manufacturers.

DEF

Chemagro Corp.
New York

DEF, a defoliant developed by Ethyl Corporation and Pittsburgh Coke and Chemical Co., is manufactured by Chemagro Corporation under license from the owners of the patent rights. Chemically, the material is S,S,S-tributyl phosphorotrithioate. It is available for testing in the formulations listed below. Chemagro requests that the nature of a contemplated project be specified when requesting samples:

DEF technical

6 lb/gal. spray concentrate

4 lb/gal. spray concentrate

10 % dust

Investigation of the defoliant properties of this material indicate that rates of 1 to 3 pounds of active per acre give excellent defoliation of cotton in the range of 90 to 95 percent. The material is fast acting. Under average conditions, researchers indicate the first visible signs will appear on the leaves 12 to 24 hours after application, and leaf drop usually begins 48 to 72 hours after application.

Studies with fiber and seed from plots defoliated with DEF are said to show no adverse effect from this compound.

The product was first marketed in 1957. Chemagro plans to expand distribution considerably this year and in the future.

The IMINYL PHOSPHATES, a new class of pesticides offered by California Spray Chemical Corp., are described in a review on page 83.

STRONG, SIFT-PROOF BAG CLOSURES!

for Automatic, Square or Flat Paper Bags

IDEAL FOR THESE PRODUCTS:

Insecticides, Fertilizers,
Chemicals, Cement Paints,
Wheat Paste, Milk Powder,
Dog Foods, Briquets,
Corn Meal, Powders and
other granular products.



FRY MODEL CSG



EXIT VIEW

Sift-proof because it double-folds, heat seals and glues on heavyweight coated or lined paper bags. Double-folds and glues only on plain kraft bags. **Strong** because the second fold is glued to the first adding shipping and carrying strength to powder tightness. And the closing operation is continuously automatic!

WRITE FOR FREE BROCHURE TODAY!

GEORGE H. FRY COMPANY

42 East Second Street, Mineola, N. Y. — Pioneer 6-6230



Now on

650 Pages

180 Illustrations

ABOUT THE BOOK

This book provides a thorough and up-to-date coverage of concentrated sprays, a relatively new concept in the application of agricultural chemicals. It will meet the requirements of growers, teachers, foresters, municipalities, research and extension workers, students, and equipment and chemical manufacturers.

The many diverse phases of agricultural chemicals, application equipment, and the agriculture to which they apply are dealt with in detail. A vast amount of new information is presented and the text is rich with new ideas and suggestions.

The broad field of concentrated spray application has grown rapidly over the past few years so that today several times as many acres now are treated with concentrated spray as with conventional spraying and dusting. As a result many types of hand, ground, and aerial equipment have been developed for the application of myriad spray formulations and combinations. This book brings together and clarifies the fundamentals and potentialities of this whole subject.

Every extension worker, county agent and forester should be able to write spray schedules, papers and memoranda, and be able to conduct local demonstrations after reading this book.

ABOUT THE AUTHOR

Samuel F. Potts was brought up on a 1200 acre cotton and livestock farm near Crawford, Mississippi. He was graduated from Mississippi State College and received a Masters Degree from the University of Maryland in 1924.

He has been with the United States Department of Agriculture since 1921. From 1925 to 1954, Mr. Potts was with the Bureau of Entomology and Plant Quarantine and he has been with the U. S. Forest Service since 1954.

His work leading to the hydrogenation of sex attractant material from glands of female gypsy moths has made it possible to trap four million acres per year at a cost of one cent per acre.

He conducted basic research leading to the development of revolutionary improvements in sprays and in ground and aerial spraying equipment, making possible the application of insecticides, fungicides, hormones, nutrients, and herbicides in the form of concentrated sprays at the rate of one to six gallons per acre. Over forty million acres are now being treated annually by this method.

Over seventy basic research publications in various phases of entomology, plant pathology, physiology, chemistry, and engineering have been authored by Mr. Potts.

Press!

copies available about May 15th.

"CONCENTRATED SPRAY EQUIPMENT, MIXTURES, AND METHODS OF OPERATION"

by
S. F. Potts

CONTENTS

CHAPTER 1—Terminology . . . Definitions of terms relating to concentrated and dilute sprays, aerosols, smoke applications and applicators.

CHAPTER II—Fundamentals of Application . . . The relation of particle size to application, distribution, and deposit, and discussions of all types of applications and applicators, including aircraft.

CHAPTER III—Ground Spray Equipment . . . Detailed descriptions and information on all ground sprayers and their use on specific crops.

CHAPTER IV—Aerial Equipment . . . A comprehensive study of all phases of aerial application including personnel, equipment, types of applications, timing, and regulations.

CHAPTER V—Mixtures . . . Covers selection of mixtures, mixing procedures, formulas, and requisites of application for all insecticides, fungicides, and liquid fertilizers.

CHAPTER VI — Control of Weeds and Woody Plants . . . A study of all the herbicides and their application on horticultural crops, field crops, highways, and forests.

CHAPTER VII—Aerosols . . . An analysis of liquefied gas aerosols, field-model aerosol machines, nozzle type machines, and aerosol generators.

CHAPTER VIII—Appendix . . . Methods of determining particle size of aerosols and fine sprays, the dilution of insecticidal chemicals, courses of instruction, pest control applicator examinations, and formulation specifications.

Send Check with Order

DORLAND BOOKS

P. O. BOX 31, CALDWELL, N. J.

\$12.50 per copy in U. S. A.

\$13.50 per copy elsewhere

Enclosed is my check for \$..... Please send copies of **CONCENTRATED SPRAY EQUIPMENT, MIXTURES, AND METHODS OF OPERATION.**

Name

Address

City State

M.S.A. ... everything for protection against today's farm chemicals

RESPIRATORS



M.S.A. FARM SPRAY RESPIRATOR

The *one* Respirator that protects against Parathion, EPN, Dieldrin, Aldrin, TEPP, HETP, OMPA, and Systox. This extra protection is the result of accepted new-type filters, which are interchangeable with in-use Farm Spray Respirators. Light weight; comfortable. Accepted by the U. S. Interdepartmental Committee on Pest Control. Write for details.

M.S.A. DUSTFOE RESPIRATOR

Ideal for breathing protection in fertilizer manufacturing. Sturdy; light weight; tops in worker acceptance. Effective filtering action against dusts not significantly more toxic than lead. Write for details.

GAS MASKS

M.S.A. GREENHOUSE MASK (GMC-1)—Safeguard against Parathion, HETP, TEPP, and other organic phosphates.

M.S.A. HYDROCYANIC ACID FUMIGANT MASK (GMK)—For use in heavy concentrations of hydrocyanic acid gases.

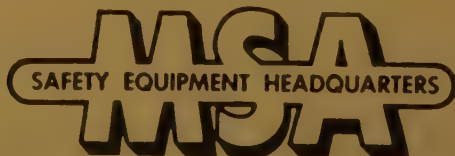
M.S.A. ORGANIC FUMIGANT MASK (GMA)—Protection against Methyl Bromide, etc.

M.S.A. ANHYDROUS AMMONIA MASK (GMD)—Safeguard against ammonia vapors. All masks are accepted by U. S. Interdepartmental Committee on Pest Control. Write for details.



PROTECTIVE CLOTHING GOGGLES—FIRST AID

Complete line of protective clothing from suits to hoods. Also goggles, faceshields, and first aid material including the M.S.A. Anhydrous Ammonia Kit.



MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pa.

At Your Service: 82 Branch Offices in the U.S. and Canada

*Throughout the year
call on Armour for*

- Phosphate Rock
- Triple Superphosphate
- Superphosphate
- Sheep Manure

Armour serves you...with 31
factories and offices!

1958

S M T W T F S							S M T W T F S						
JAN.							JULY						
			1	2	3	4				1	2	3	4
5	6	7	8	9	10	11	6	7	8	9	10	11	12
12	13	14	15	16	17	18	13	14	15	16	17	18	19
19	20	21	22	23	24	25	20	21	22	23	24	25	26
26	27	28	29	30	31		27	28	29	30	31		
FEB.							AUG.						
						1						1	2
2	3	4	5	6	7	8	3	4	5	6	7	8	9
9	10	11	12	13	14	15	10	11	12	13	14	15	16
16	17	18	19	20	21	22	17	18	19	20	21	22	23
23	24	25	26	27	28		24	25	26	27	28	29	30
MAR.							SEP.						
						1							
2	3	4	5	6	7	8	1	2	3	4	5	6	
9	10	11	12	13	14	15	7	8	9	10	11	12	13
16	17	18	19	20	21	22	14	15	16	17	18	19	20
23	24	25	26	27	28	29	21	22	23	24	25	26	27
30	31						28	29	30				
APR.							OCT.						
			1	2	3	4				1	2	3	4
6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30				26	27	28	29	30	31	
MAY							NOV.						
				1	2	3							
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30	31	23	24	25	26	27	28	29
JUNE							DEC.						
1	2	3	4	5	6	7	1	2	3	4	5	6	
8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30						28	29	30	31			

ARMOUR FERTILIZER WORKS
GENERAL OFFICE, P.O. BOX 1685
ATLANTA 1, GEORGIA

AGRICULTURAL CHEMICALS

CUCURBIT TREATMENTS

(From Page 77)

treated or fungicide-only plots were injured. Many plants were so severely injured that the growing points were killed, and the plants did not advance beyond the cotyledonary stage. Dieldrin and lindane gave slightly better results than heptachlor. Dust and slurry treatments were similarly effective.

Analysis of the factorial experiment showed that captan and thiram were equal in effectiveness in fine sandy loam, but in silt loam captan

was more effective. The two fungicide dosage rates resulted in similar emergence in fine sandy loam, but in silt loam the higher dosage, 0.26% by weight, gave somewhat greater emergence. Differences between insecticides were not significant. The 1:4 insecticide-fungicide ratio resulted in slightly greater emergence than the 1:8 ratio in silt loam. In fine sandy loam, captan was more effective at the 0.13% dosage, whereas thiram was more effective at 0.26%. In silt loam both fungicides were better at the higher rate.

CONCLUSIONS: The experiments

Table 1. Emergence of plants from National Pickling cucumber seed treated with fungicide alone and with combination treatments containing different ratios of insecticide to fungicide.

Insecticide	Fungicide		Ratio of insecticide to fungicide ^b	Emergence ^c	
	Material	% by wt. of seed ^a		Fine sandy loam per cent	Silt loam per cent
Dieldrin	Orthocide 75	0.03	1:8	64	40
"	"	0.06	1:8	70	44
"	"	0.06	1:4	67	48
"	"	0.12	1:4	66	38
"	Arasan SF	0.26	1:8	68	50
"	"	0.52	1:8	62	38
"	"	0.26	1:4	65	45
"	"	0.52	1:4	67	50
Heptachlor	Orthocide 75	0.26	1:8	61	46
"	"	0.52	1:8	58	41
"	"	0.26	1:4	65	42
"	"	0.52	1:4	63	45
"	Arasan SF	0.26	1:8	62	41
"	"	0.52	1:8	58	45
"	"	0.26	1:4	64	40
"	"	0.52	1:4	67	43
Lindane	Orthocide 75	0.26	1:8	58	36
"	"	0.52	1:8	55	34
"	"	0.26	1:4	64	41
"	"	0.52	1:4	62	38
"	Arasan SF	0.26	1:8	52	41
"	"	0.52	1:8	58	34
"	"	0.26	1:4	64	35
"	"	0.52	1:4	66	46
None	Orthocide 75	0.26	—	53	34
	"	0.52	—	52	41
	Arasan SF	0.26	—	50	25
	"	0.52	—	56	33
None	None	—	—	38	19
Dieldrin	Orthocide 75 ^d	0.26	1:4	66	34
"	Arasan SF ^d	0.26	1:4	68	42
Delsan A-D		0.26		64	48
Ortho Seed Guard		0.26		67	39
GLF Combination Seed Tr. #1		0.26		63	33
Least difference for significance at 5%				11	13
" " " " " at 1%				11	13

^aBased on active ingredient, pesticides applied in slurry form except where otherwise indicated.

^bRatio is based on amount of active ingredient of each pesticide.

^cAverage emergence from 6 replications of 100 seeds each.

^dTreatments applied as dusts.



Deodorants and Reodorants for FERTILIZER

Application of aromatics to commercial fertilizer, both organic and manufactured, is of increasing interest to producers. In the D&O Industrial Odorant Laboratories both masking and reodorizing compounds have been developed for *soluble phosphate fertilizers, nitrogen-based products and organic materials* such as dried blood, sewage sludge, animal manure, tankage, meat scraps, etc. Fertilizers can be rendered odorless — or a suitable scent, reminiscent of a farm environment, peat or humus can be added — at competitive costs. Write for specific details.

Essentially for You



Our 159th Year of Service

DODGE & OLCOTT, INC.

180 Varick Street
New York 14, N. Y.

Sales Offices in Principal Cities

Essential Oils
Aromatic Chemicals
Perfume Bases
Flavor Bases
Dry Soluble Seasonings

CONTACTS IN EVERY CORNER OF THE WORLD

Woodward & Dickenson

serves you

with a long reputation for reliability in quality, price and delivery.

POTASH

NITROGEN

MURIATE
SULPHATE
NITRATE

SULPHATE OF AMMONIA
AMMONIUM NITRATE
CALCIUM AMMONIUM NITRATE
UREA

AND ALL OTHER FERTILIZER AND FEED MATERIALS



ESTABLISHED 1873
Woodward & Dickenson
Inc.

1400 SOUTH PENN SQUARE, PHILADELPHIA 2, PA., U.S.A.
TELEPHONE: LOcust 4-5600 Cable Address: "Woodward" TELETYPE: PH109

Branches in MADRID, MANILA, TOKYO, SEOUL, WASHINGTON, D. C., U. S. A.

**AVAILABLE in COMMERCIAL
QUANTITIES DDVP**

DIMETHYL DICHLORO VINYL PHOSPHATE is now being used in sugar-based fly baits and as a phoracide in mushroom culture. Because of its high insect toxicity in very low concentrations; and its relatively low toxicity to warm-blooded animals and lack of residue, experimental work is suggested in many fields of application. DDVP is now being supplied in commercial quantities for authorized uses and in experimental quantities to qualified experimenters.

**AVAILABLE in COMMERCIAL
QUANTITIES DET**

DIETHYL TOLUAMIDE, the "most" successful wide-spectrum insect repellent developed by the U.S.D.A. and Army Quartermaster Corps. Montrose DET is guaranteed to contain 95% minimum meta isomer, the most effective isomer as shown by field tests. DET aerosol, lotion and spray formulations were successfully marketed in 1957. Montrose DET is available for prompt shipment from stock.

Manufactured by

MONTROSE CHEMICAL COMPANY

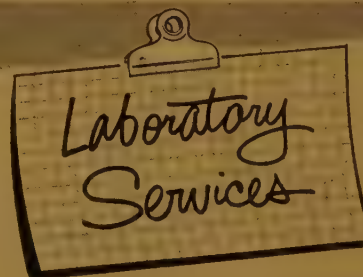
104-112 Lister Avenue Newark 5, New Jersey

Sales Agents

R. W. GREEFF & CO., INC.

10 Rockefeller Plaza, New York 20, N. Y.

1721 Tribune Tower, Chicago 11, Illinois



Biological evaluation of insecticides
Screening of compounds for insecticidal, fungicidal, and bactericidal properties
Flavor evaluation of pesticide-treated crops
Bio-assay of insecticide residues on crops
Chemical determination of insecticides
Pharmacology including warm-blooded toxicity studies
Warfarin assays — physico-chemical and biological
Other biological, chemical and microbiological services

PROJECT RESEARCH
AND CONSULTATION
Write for Price Schedule

**WISCONSIN
ALUMNI
RESEARCH
FOUNDATION**

P.O. BOX 2217 • MADISON 1, WIS.

showed that under conditions favoring injury from the seed-corn maggot and from seed rot organisms, emergence of cucumber and squash seed is increased by combination insecticide-fungicide treatments. Frequently the combination treatments resulted in more vigorous seedlings than were produced by untreated seed or seed treated with a fungicide only.

For cucumber seed, dieldrin, combined with either captan or thiram, gave better results than heptachlor or lindane. There were no differences between the two fungicides in the combination treatments. The insecticide-fungicide ratio may be important with cucumber seed. The 1:4 ratio resulted in better emergence than the 1:8 ratio.

For squash seed, in silt loam captan gave better results than thiram in the combination treatments, while in fine sandy loam the two fungicides were equally effective. Captan apparently caused hardening of the seed coat in fine sandy loam. Although not serious, the condition may have been partially responsible for lower emergence from seed treated with captan at the higher dosage★★

Conn. Station Honors Six

Six members of the staff of the Connecticut Agricultural Experiment Station, New Haven, who recently completely 25 years of service were honored by the station board of control on April 23.

They are Richard T. Merwin, Milford; Janetha L. Shepard, Mt. Carmel; Alton V. Miller, Canaan; A. R. Olson, Madison; George R. Smith, New Haven; and Carl Swanson, Windsor. The six received scrolls signed by Governor Ribicoff and Edmund M. Sinnott, president and secretary respectively of the Board of Control.

Whitlock Joins Texas Co.

Walter J. Whitlock has joined the Petrochemical Sales Division of The Texas Co., New York, as a sales engineer. His headquarters are in Chicago.

Mr. Whitlock will give technical assistance to fertilizer manufacturers and other users of ammoniacal and nitrogen solutions.

Hercules Grants To Colleges

Approximately \$100,000 in unrestricted grants-in-aid is being distributed by the Hercules Powder Co., Wilmington, Del., to some 24 American colleges and universities.

This is the third consecutive year Hercules has carried out this program, giving the schools complete freedom in the use of these funds. These grants are in addition to grants of various kinds for specific purposes made by the company.

DIATOMITES

(From Page 4)

lished. Since diatomites from different sources have different physical properties, it is reasonable to assume that they behave differently as conditioning agents. The extent and the degree to which a potential conditioner is able to coat a prill is in all probability a measure of its efficiency in this application. It is therefore, the purpose of this paper to show that proper illustration of such coating behavior can be useful in predicting efficiency were the samples subjected to warehouse storage tests.

A low-power photomicrographic technique has been described which in the author's opinion satisfies these aims. The extension of this type of evaluation to illustrate the distribution of conditioners on opaque mixed analysis fertilizers is contemplated.

Acknowledgements

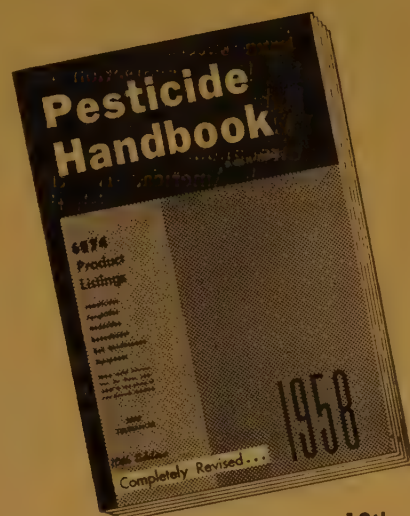
The author gratefully acknowledges the assistance of Messrs. T. Ozarda and E. Morrison of the Johns-Manville Research Center Photographic Laboratory who prepared the photos herein used, and the help of Mr. J. E. Awde of the Celite Application Research Section under whose supervision the coating tests were performed.

References Cited

- ¹Ross, W. H., Yee, J. Y. and Hendricks, S. B., *Ind. and Eng. Chem.* 37, 1079 (1945).
- ²Ross, W. H., Adams, J. R., Yee, J. Y., Whittaker, C. W. and Love K. S., *U. S. Dept. Agr. Tech. Bulletin* 912 (1946).
- ³Shiaron, W. H. and Dunwoody W. B., *Ind. and Eng. and Chem.* 45, 496 (1953).
- ⁴Silverberg, J., Lehr, J. R. Hoffmeister, G. Jr., *Agr. Chem.* 12, 38 (1957).

10th ANNIVERSARY

Completely Revised



10th
YEAR

UP-TO-THE-MINUTE

Edition

Reporting on over

6100

Trade Names

AN IMPORTANT BOOK FOR THOSE INTERESTED IN ANY PHASE OF PEST CONTROL

County agents, extension and research specialists, manufacturers, salesmen, jobbers, dealers, purchasing agents, health officers, farmers and librarians have found this publication to be extremely useful time and time again. *Pesticide Handbook* is the ONLY book giving complete up-to-the-minute information on over 6100 commercial products, completely indexed by trade names, active ingredients and manufacturers.

at your fingertips—

You'll find a wealth of information on fungicides, insecticides, rodenticides, adjuvants, diluents, compatibilities, antidotes, pest control equipment.

about the editor—

Dr. Donald E. H. Frear, Editor of PESTICIDE HANDBOOK 1958, is one of the leading authorities on the chemistry of pesticides. He is the author of "Chemistry of Insecticides and Fungicides," the first book dealing with this subject published in the United States. In addition, he has written several other books, including "Chemistry of Insecticides, Fungicides, and Herbicides." Dr. Frear is Professor of Agricultural and Biological Chemistry at The Pennsylvania State University.

Over
200 Pages

1.50

Cloth Bound Edition.....ea. 3.00
Postage included on prepaid orders

Send Today

PESTICIDE HANDBOOK

P. O. BOX 798

STATE COLLEGE, PENNSYLVANIA

Get Season Long Protection with **CHEM-BAM**

The 100% Proven Effective Fungicide
For Blight* Protection

Scientific proof from leading agricultural college at its vegetable research farm — plus on-the-spot farm tests have successfully demonstrated CHEM-BAM'S 100% protection for better quality crops and higher yields.

CHEM-BAM is used for vegetable disease prevention throughout the United States, Canada, Cuba and South America. It's the new, improved agricultural liquid spray with the exclusive U-101.

Check these features . . .

CHEM-BAM . . . the only fungicide that gives 100% protection against blight.

CHEM-BAM . . . can't damage plant tissues. Perfectly safe at all times.

CHEM-BAM . . . with exclusive U-101, sticks to plants through rain and repeated watering . . . can't wash off.

CHEM-BAM . . . insures full-size, healthier, luscious-looking vegetables.

*potato blight

For further and more complete details phone or write

CHEMICAL INSECTICIDE CORPORATION

30 Whitman Ave. • Metuchen, N. J. • Liberty 9-2300



solvency Up...costs Down!

RICHFIELD TOXISOL B

and **TOXISOL PX**

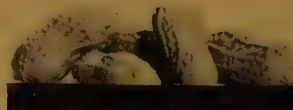
These solvents assure you improved formulations at lower cost. For tests, specifications, prices . . . write to:

RICHFIELD OIL CORPORATION

Special Products Dept.

555 South Flower Street

Los Angeles 17, California



Spray Nozzle Reference Data | *Years FOR THE ASKING*

TEEJET SPRAY NOZZLES

with choice of over four hundred interchangeable orifice tips. Every type of spray pattern. Write for Catalog 30.

TEEVALVE

selector valve for booms with spray selection in shut-off position. Write for Bulletin 84.

GUNJET SPRAY GUNS

for pressures up to 800 p.s.i. Interchangeable tips for every use. Bulletins 65, 69 and 80.

BOOMJET SPRAY NOZZLES

spray up to 66 feet wide for broadcast spraying with one nozzle. Bulletins 66 and 71.

PRESSURE RELIEF VALVES

dual spring assembly for low and high pressures . . . write for Bulletin 83.

SUCTION STRAINERS

withdraw liquid within 1" of drum bottom. Write for Bulletin 85.



AND FOR ACCESSORIES OF ALL KINDS—CATALOG 30.
SPRAYING SYSTEMS CO., 3230 Randolph St., Bellwood, Ill.

*Suppliers to
the industry*
Tamms

Let color identify your brand!

OXIDES

(RED, YELLOW, BROWN, BLACK)

SYNTHETIC RED OXIDES

(STRONG ECONOMICAL COLORS)

CLAYS AND MULTICEL (ANTI-CAKING AGENTS)

TAMMS INDUSTRIES CO.

RM-27-228 N. LA SALLE ST., CHICAGO 1, ILL.

Trade Listing

AGRICULTURAL CHEMICALS magazine
Wayne E. Dorland, publisher
Eleonore Kanar, editor
P. O. Box 31
Caldwell, N. J.
Telephone: CAldwell 6-5520

National Agricultural Chemicals Assn.
Lea Hitchner, executive secretary
Association Building
1145 19th Street, N. W.
Washington 6, D. C.
Telephone: STerling 3-2833

National Plant Food Institute
Executive vice presidents:
Russell Coleman and Paul Truitt
1709 K Street, N. W.
Washington 6, D. C.
Telephone: District 7-0225

*The following are the regional offices of
the National Plant Food Institute*

Northeast Regional Office
Willard H. Garman, director
1700 K Street, N. W.
Washington 6, D. C.
Telephone: District 7-0225

Southeast Regional Office
Samuel L. Tisdale, director
1220 Healey Bldg.
Forsyth, Walton and Poplar Streets
Atlanta 3

Pacific Northwest District
F. Todd Tremblay, Representative
2350 27th Avenue, West
Seattle 99, Washington
Telephone: Garfield 1032

Western Regional Office
Dr. Richard B. Bahme, Representative
550 Kearny Street
San Francisco 8, California
Telephone: YUkon 2-8173, 2-8174

Southwest Regional Office
Dr. Robert L. Beacher, Director
Route 8, Township Road
Fayetteville, Arkansas
Telephone: Hillcrest 2-4552

Midwest Regional Office
(Formerly Middle West Soil Improve-
ment Committee)
Zenas H. Beers, director
228 North La Salle Street
Chicago 1, Illinois
Telephone: State 2-9361

PROFESSIONAL DIRECTORY

FLORIDA FIELD TRIALS

Evaluations
of
Agricultural Chemicals.

DR. G. R. TOWNSEND

Box 356
Belle Glade, Florida

Sperling Laboratories

Toxicology — Pharmacology
Physiology
Soil Analysis

Frederick Sperling, Ph.D.
Formerly Pharmacologist-in-Charge
Pharmacological and Rodenticide
Laboratory
U. S. Department of Agriculture
6815 N. 24th St. Arlington 13, Va.

SOIL & PLANT TESTS

SOIL FERTILITY PROBLEMS

EVALUATION OF AGRICULTURAL CHEMICALS

Dr. Wolf's Agricultural Laboratories
2620 Taylor St. Hollywood, Fla.

RESEARCH, ANALYSIS CONSULTATION

Toxicology, Pharmacology, Bacteriol-
ogy, Biochemistry, Chemistry, Nutri-
tion, Radiochemistry.

New Price Schedule Available
3755 Forest Park Avenue

SCIENTIFIC ASSOCIATES

St. Louis 8, Missouri
JEfferson 1-5922

Chemical & Engineering Analyses, Research & Development

Agricultural Chemical Analyses.
Insecticides, Fungicides, Herbicides,
Rodenticides, Fertilizers.
Toxicology. Market Research.
Product Development.

Ask for complete details; call —
WAtkins 4-8800
or write to:

SNELL

Foster D Snell, Inc.
29 W. 15th STREET
New York 11, N. Y.

ALVIN J. COX, Ph.D.

Chemical Engineer and Chemist

(Formerly Director of Science, Govern-
ment of the Philippine Islands. Retired
Chief, Bureau of Chemistry, State of
California, Department of Agriculture.)

ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS

Consultant in reference to spray injury
and damage, claims, including imports
of fruits and nuts, formulas, labeling,
advertising and compliance with law.

1118 Emerson Street
Palo Alto, California

FRIAR M. THOMPSON, JR. Consultant

Specializing in insecticides,
rodenticides, fungicides, weed
controllers for industry, house-
hold, and farm.
Product formulation, testing,
labeling.

Athens, Georgia

Theodore Riedeburg Associates

Sales Consultants
and
Manufacturers' Representatives
on
Agricultural Chemicals

415 Lexington Ave.
New York 17, New York
MUrray Hill 7-1488

New Tolerances For Captan

The Food and Drug Administration has issued a new tolerance for Captan, a fungicide marketed by Stauffer Chemical Co., New York, and California Spray Products Co. The new regulations set a residue tolerance of 100 parts per million of Captan on a broad range of crops.

This means that in practice, Captan, which chemically is N-trichloromethyl-mercapto-4-cyclohexene-1,2-dicarboximide, may be used to spray or dust many food crops at any state of their growth. Moreover, the level of safety of the fungicide is such that it may be used as a post-harvest treating agent for a number of fruits and vegetables. Such post-harvest treatments, by spraying, dusting or dipping, prevent deterioration of the produce from fungus infections which may develop in transit or in storage.

Joins Pittsburgh Coke

Frank T. Cunniff has joined the Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., as market research manager. Mr. Cunniff is responsible

for marketing research studies on products and programs under consideration by the company's Chemical Group.

Prior to his appointment as market research manager, Mr. Cunniff served as distribution analyst with Esso Standard Oil Company, and was supervisor of industrial chemical market research for the Nitrogen Division of Allied Chemical and Dye Corporation.

Adds To Bartow Plant

Added processing facilities at the Bartow, Fla. triple superphosphate plant of the Davison Chemical Company Division of W. R. Grace & Co. enable the plant to produce run-of-pile triple superphosphate in addition to the granulated material previously turned out.

Both processing and storage facilities were added to the Bartow plant. The additional process does not raise the overall production total of the plant, which originally was rated at 200,000 tons annually of triple superphosphate.

Pakistan Factory Producing

The Pak-American Fertilizer Factory, built by the Pakistan Industrial Development Corporation at Daudkhel, Pakistan, has started production of ammonium sulfate. The plant will have a capacity of 50,000 tons.

The plant is unique in that for the first time a gasification plant is using Pakistani coal which has a high sulfur content. Daudkhel was chosen for the site of the factory because of the deposits of raw materials available in the vicinity. Coal is mined at Makerwal, 25 miles away; gypsum is abundant in the surrounding hills; and the River Indus flows near by.

Heads CSC Chicago Office

Bernard F. Nachtman has been named manager of the Chicago district office for Commercial Solvents Corp., New York.

Mr. Nachtman joined CSC in 1947 as an industrial chemicals salesman assigned to Kansas City. In 1951 he became manager of the Cleveland district office, a post he held at the time of his new appointment.

MUNSON



Here's why more and more
MUNSONS are doing the
important mixing jobs

• Munson Mixers will quickly blend various chemical compounds into a homogeneous, accurate mixture, no reduction in particle sizes • They blend powders and granules • Spray pipes may be installed to spray liquids on dust and granular materials • Internal vent pipe to expel toxic fumes • Drum may be heated or cooled • Granular fertilizers can be coated with insecticide dust • Will blend chemicals, fertilizers, insecticides, herbicides, antibiotics, and many other materials • Available in several models • Low horsepower • 20 to 250 cu. ft. mixing capacity
TELL US YOUR MIXING PROBLEMS... write or phone for the complete story on Munson Rotary Batch Mixers.

MUNSON MILL MACHINERY COMPANY
Dept. A-358 210 Seward Ave., Utica, N.Y.

ROTARY BATCH MIXER

AGRICULTURAL CHEMICALS

offers practical features on manufacturing processes, market information, merchandising aids, survey data, and technical and toxicological data on agricultural chemicals. Also included are monthly features by industry experts on topics of current interest, reviews of technical literature, new industry products, equipment, and bulletins and news about the agricultural chemicals industry.

CLIP AND MAIL TO

AGRICULTURAL CHEMICALS, P.O. Box 31, Caldwell, N. J.

Please enter subscription(s) as follows:

(Check or money order enclosed)

☐ One year, \$3.00 (Canada \$4.00; Foreign \$9.00)

☐ Two year, 05.00 (Canada \$7.00; Foreign \$15.00)

NAME _____
(Please Print)

FIRM _____

STREET _____

CITY _____

CLASSIFIED ADVERTISING

Rates for classified advertisement are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Check must accompany all classified advertisements. Address all replies to Classified Advertisements with Box Number care of AGRICULTURAL CHEMICALS, P. O. Box 31, Caldwell, N. J. Closing date: 10th of preceding month.

For Sale:

FOR SALE: Rotary Dryers 6' x 30', 5½' x 50', 5' x 30'; Ribbon Mixers 40 & 90 & 225 cu. ft.; 1—10,000 gal. aluminum Storage Tank; Rotex & Tyler Screens, single and double deck; Mikro Pulverizers; Raymond Mills, etc. Send us your inquiries. BRILL EQUIPMENT CO., 2401 Third Ave., New York 51, N. Y.

FOR SALE: Used copies Agricultural Chemicals for 1947 thru 1951 inclusive. If interested please write Box 195, c/o Agricultural Chemicals.

FOR SALE: Good Rebuilt Equipment at Savings of HALF and MORE; Hersey Gas Fired Dryer 5' x 26' Sperry and Shriver Filter Presses upto 42" now in stock; Stainless Lancaster Rotary Reactor 50" x 17¼"; 5000 Gal. S/S mixing Tanks; 40 HP; Pebble Mills size upto 8' x 8'; NEW Falcon Ribbon Blenders all sizes; Hammer Mills upto 100 HP; Sifters by Rotex, Patterson, Robins; all sizes; Send for Bulletin "FIRST FACTS." FIRST MACHINERY CORP. 209-289 Tenth St. Bklyn. 15, N. Y.

1957 FUNGICIDE TESTS

The complete results of 1957 fungicide tests, listing response of various crops to commercial and experimental fungicides, are contained in a bound booklet.

Price: \$1.00

Postpaid if check accompanies order—postage and handling charges added where orders must be billed.

Send check with order to:

Dr. A. B. Groves
Winchester Fruit Research Lab.
Rural Route 3
Winchester, Virginia

LIQUIDATION SALE: 10—Louisville Rotary Steam Tube Dryers, 6' x 50', 6' x 30', 6' x 24'; located Kentucky. (Note: Tubes can be easily removed.) Priced for quick sale. Also Munson 100 cu. ft. Blender, Ribbon Mixers, Tanks, etc. Perry Equipment Corp., 1428 No. 6th St., Phila. 22, Pa.

Miscellaneous:

BAG PACKERS: New and used Bag Packers for filling valve, open mouth bags and drums—Representatives in 24 principal cities in the United States and Canada. H. L. STOKER COMPANY, 111 South College Avenue, Claremont, California.

PLANTERS CORRAL, Inc., West Babylon, N. Y., has been granted a charter of incorporation. The company will deal in fertilizers.

FERTILIZER VIEWS

(Continued from Page 46)

cutting down the total expenses may do more harm than not. Important idea is to increase output per unit (cow, beef, acre, and so) which in turn reduces crop unit cost per acre.

All this is another way of saying: To use fertilizer is to make money.

THE NINTH ANNUAL Agricultural Aircraft Association convention will be held at the Senator Hotel, Sacramento, Calif., Jan. 22 to 24, 1959..

AC

SYNTHETIC FERTILIZERS AND CHEMICALS, New York, has been appointed a representative of the Lainiere de Sclessin of Belgium, manufacturers of the Lainyl synthetic filter cloths.

**Vacation -
as you like it
MIAMI BEACH**

- On the Ocean
- 100% Central Air Conditioned
- Central Heating
- Private Swimming Pool
- Large Private Beach
- Circulating Ice Water in Rooms
- Radio in Every Room
- Coffee Shop Adjacent
- Cocktail Lounge Adjacent
- Television • Shuffleboard
- Free Parking • Card Room
- Near Golf Range
and Children's Playground

Write for Brochure and Rates.

**Fountainhead
MOTEL**

Directly on the Ocean at 160th St.

WASHINGTON REPORT

(From Page 45)

couragement for concerned government agencies to request extra funds for this purpose in their next budget requests.

* * * * *

USDA is moving cautiously in furthering its gypsy moth eradication program in the Northeast. Pennsylvania has announced a spray program for 500,000 acres of forest in six eastern Pennsylvania counties this year as a mopping up operation. By the end of this 1958 season, USDA expects to have consolidated the areas from which the gypsy moth has been eliminated. This might be called a "containment policy" so far as the gypsy moth is concerned this year. Other USDA programs against the khapra beetle, the grasshopper, and the imported fire ant are moving ahead on schedule.

* * * * *

Hearings ended April 14th in Washington on proposed legislation covering chemical additives to foods. The latest word from the hearing rooms seems to be that chemicals covered under the Miller Amendment will apparently be excluded from the scope of any bill which may be reported out by the committee (Health and Science Subcommittee of the House Interstate and Foreign Commerce Committee). And observers believe, incidentally, that the committee will report a bill. This measure has been under consideration ever since the Delaney hearings back in 1950.

The new bill will probably, we are told, set up authority over some chemicals not previously covered under the Miller Amendment, — materials such as defoliants, desiccants, thinning sprays, plant growth regulators, nematocides, etc.

* * * * *

The problem of regulatory control of defoliants, desiccants and plant growth regulators has been under consideration by NACA in an attempt to arrive at a uniform regulatory pattern. NAC staff, Legislative and Technical Committees have been working with a joint committee ap-

pointed by the Association of American Pesticide Control Officials and the Association of American Fertilizer Control Officials, and a proposed uniform regulatory measure for submission to the states is now being put together.

A number of states have already set up controls, which are developing in a confused fashion. In some states such products are now regulated under the fertilizer laws, in some under pesticide laws, and in others through special legislation. The end result sought, of course, is to achieve a uniform pattern of control.

* * * * *

Pesticide carryover stocks for the year ended September 30, 1957 totaled 259 million pounds, a 15 per cent higher total than for the comparable period ending September, 1956. Thirty eight percent of the stocks reported are in the formulations. The survey is made annually by the U. S. Department of Agriculture, with NACA members cooperating.

DDT stocks at the end of the 1957 season totaled 24 million pounds, somewhat under the 1956 total. BHC stocks (gamma form) at 8 million pounds (1957) are about the same as for the previous year, while calcium arsenate stocks (probably because of boll weevil resistance) at 8 million pounds are substantially higher than for the 1956 year-end. The group of

A brief summary of the 1957 year-end stock picture is as follows:

Millions of Lbs.

aldrin, dieldrin, toxaphene, heptachlor, etc.	32
BHC (gamma isomer)	5.9
calcium arsenate	8
copper fungicides	9
2,4-D (acid basis)	17
DDT	24
fumigants	50
lead arsenate	3
organic phosphates	8
ground sulfur	30
2,4,5-T (acid basis)	4
miscellaneous miticides	1.3
other fungicides	10
other insecticides	14
other herbicides	17
miscellaneous	3.4

* * *

insecticides: aldrin, dieldrin, toxaphene, heptachlor, etc, total 32 million pounds, (1957) about the same as in the previous year.

A new publication, "What's New in Agriculture" is being offered by Farm Science Syndicate, Evanston, Illinois, at \$15 a year. The booklet which is published twice a month, contains abstracts from technical and non-technical periodicals, including: *Agricultural Chemicals*, *Journal of Economic Entomology*, *Cappers Farmer*, *Progressive Farmer*, *Cornell Veg. News*, and some 200 other journals.

The first issue, out April 5th, totaled 8 pages, containing 40 abstracts.

■

Nitrate Ban in Baltimore

The Baltimore City Council has appointed a committee to consider a proposal to ban the movement of ammonium nitrate through the port of Baltimore. William H. Marshall, assistant city solicitor is chairman of the committee. Other members of the committee include A. W. Kabernagel, marine supervisor for the Maryland Port Authority; Chief M. H. Lotz of the fire department, and Cmdr. R. R. Smith of the coast guard.

A hearing was held April 15th at which witnesses testified as to the dangerous qualities of ammonium nitrates, although several urged that any restriction on the shipment of nitrates through Baltimore not be so stringent as to interfere with the general movement of fertilizers.

Chief Lotz told the Council that every type of fertilizer contains some ammonium nitrates; and Captain Kabernagel called for the complete ban of some types of ammonium nitrate. He said ammonium nitrate is more dangerous than dynamite, because it will explode from percussion, concussion and ignition.

■

Escambia Opens Florida Plant

The Escambia Chemical Corp.'s new methanol plant near Pensacola, Fla., is the company's third production unit in the Pensacola area to start production since 1955.

Escambia also operates a nitrogen plant and a polyvinyl chloride resins plant near Pensacola.

AGRICULTURAL CHEMICALS

INDEX to ADVERTISERS

A. B. Farquhar Division, The Oliver Corp.	Apr.
American Agricultural Chemical Co.	Apr.
American Cyanamid Co.	30, 100
American Potash & Chemical Corp.	Apr.
Antara Chemical Div., General Aniline & Film Corp.	17
Armour & Co.	114
Ashcraft-Wilkinson Co.	22
Bagpak Div., International Paper Co.	2nd Cover
Baughman Manufacturing Company	Apr.
Bemis Bros. Bag Co.	98
Berkshire Chemicals, Inc.	109
Blue Valley Equip. Mfg. & Engr. Co.	Mar.
Bradley Pulverizer Co.	23
Chase Bag Co.	10
Chemical Construction Corp.	47
Chemical Insecticide Corp.	118
Chemagro Corp.	Apr.
Clark Equipment Corp.	86
Continental Can Co., Shellmar Betner Div.	96
R. D. Cole Mfg. Co.	Mar.
Combustion Engineering, Inc., Raymond Division	12
Commercial Solvents Corp.	Mar.
Cox, Dr. Alvin	119
Crown Zellerbach Corp.	Mar.
Davies Nitrate Co., Inc.	Apr.
Davison Chemical Co., Div. of W. R. Grace & Co.	Apr.
Diamond Alkali Co.	66
Dodge & Olcott, Inc.	115
Borr-Oliver Co.	Apr.
Du Pont de Nemours & Co.	20
Duval Sulphur & Potash Co.	22
Eastern States Petroleum & Chemical Corp.	85
Eastman Chemical Products, Inc.	Feb.
Emulsol Chemical Corp.	Apr.
Escambia Chemical Corp.	Apr.
Fairfield Chemical Div., Food Machinery & Chemical Co.	4th Cover
Floridin Co.	18

Fry Co., Geo. H.	111
General Reduction Company	99
Glendon Pyrophyllite Co.	101
Glenn Chemical Corp.	69
Grand River Chemical Division of Deere & Co.	Apr.
Greeff & Co., R. W.	116
Grinnell Co.	90
Heckathorn United & Co.	74
Hercules Powder Co.	62
Hooker Electrochemical Co.	82
Huber, J. M. Corp.	107
International Minerals & Chemical Corp.	14, 15
Johns-Manville Co.	8
KLM Royal Dutch Airlines	110
Kolker Chemical Corp.	68
Kraft Bag Co.	87
Magnet Cove Barium Co.	Apr.
McDermott Bros.	Apr.
Merck & Co.	94, 95
Michigan Chemical Corp.	Apr.
Miller Chemical & Fertilizer Corp.	108
Moasanto Chemical Co.	Apr.
Munson Mill Machinery Co.	120
Mine Safety Appliances Co.	114
National Potash Co.	3rd Cover
Niagara Chemical Division, Food Machinery & Chemical Corp.	64
Ninol Laboratories, Inc.	Mar.
Nitroform Agricultural Chemicals, Inc.	Mar.
Nitrogen Div., Allied Chem. & Dye Corp.	51, 54
Olin-Mathieson Chemical Corp.	103
Penick, S. B. & Co.	80
Pennsalt of Washington Division, Pennsalt Chemicals Corp.	Apr.
Penola Oil Co.	70
Phelps Dodge Refining Corp.	50
Phillips Chemical Co.	Apr.
Potash Company of America	3
Poulsen Co.	105

Prentiss Drug & Chemical Co.	Mar.
Raymond Bag Corp.	Apr.
Raymond Division, Combustion Engineering, Inc.	12
Republic Steel Corp.	Apr.
Renneburg & Sons Co., Edw.	97
Reideburg, Theodore Associates	81, 119
Rohm & Haas Co.	60
Richfield Oil Corp.	118
Sedberry, J. B. Inc.	Feb.
Shell Chemical Corp.	6, 7
Sinclair Chemicals, Inc.	Mar.
Snell, Foster D., Inc.	119
Southeastern Clay Co.	Apr.
Southwest Potash Corp.	16
Spencer Chemical Co.	92
Sperling Laboratories	119
Spraying Systems Co.	118
Standard Oil Co. (Indiana)	Apr.
Standard Agricultural Chemicals, Inc.	72
St. Regis Paper Co.	Apr.
Sturtevant Mill Corp.	24
Summit Mining Corp.	Apr.
Tamms Industries Company	118
Tennessee Corp.	19
Texas Co.	Apr.
Texas Gulf Sulphur Co.	Apr.
Thayer Scale Co.	Apr.
Thomas Alabama Kaolin Co.	25
Thompson, Friar M., Jr.	119
Townsend, Dr. G. R.	119
Union Bag-Camp Paper Co.	13
Union Carbide Chemical Co.	Mar.
U. S. Borax & Chemical Corp.	21
U. S. Industrial Chemical Co.	Apr.
U. S. Phosphoric Products, Div. Tennessee Corp.	56
U. S. Potash Co.	11
Vanderbilt Co., R. T.	93
Velsicol Chemical Corp.	4
Victor Chemical Works	26, 27
Webrib Steel Co.	Apr.
Wisconsin Alumni Research Foundation ..	116
Dr. Wolf's Agricultural Labs	119
Woodward & Dickerson, Inc.	116
Yale & Towne Mfg. Co.	28, 29
Young Machinery Co.	106
Zonolite Co.	Apr.

TALE ENDS

HOW are fertilizer manufacturers doing in the current recession? Not too well, it appears, across the board, although the blame is being assessed on the cold, wet spring rather than to the general business decline.

"Cold, wet weather throughout much of the nation's farm belt has sent nitrogenous fertilizer sales skidding and warehouse stocks soaring" reported the *Wall Street Journal* in an early April issue. The *Journal* quotes Kenneth A. Spencer, president of Spencer Chemical Co., as saying, "Our shipments are seriously delayed and

inventories are at an all time high for this time of year". As a result, Mr. Spencer said, sales and earnings for the first quarter will be below comparable 1957 totals. And he indicated some concern as to whether lost sales could all be made up even with improving weather. "In the wheat belt as far north as the Kansas border," said Mr. Spencer, "the wheat is too high for ammonium nitrate top dressing, so we've lost a good part of that business."

B. W. Knowles, manager of nitrogen sales for Olin Mathieson at the Little Rock, Ark., plant food division, told the *Wall*

Street Journal that sales in March '58 were 20% under March '57. "We're expecting a short season," said Mr. Knowles, "and taking every precaution to make sure we have sufficient inventories close to the point of consumption to be ready when and if the weather improves."

Big improvement was noted in April, and movement of all type fertilizers was reported very heavy.

First quarter ammonia sales for Monsanto Chemical Co. were reported to be behind last year's first three months, and inventories somewhat higher. A spokesman for the Nitrogen division of Allied Chemical was quoted as saying that sales were running about a month behind last year, but was optimistic that clearing weather would enable them to catch up.

At the annual stockholders' meeting of Commercial Solvents Corp. in early April, J. Albert Woods, president, noted that "sales of the company's nitrogen products, primarily to the fertilizer industry, have shown marked improvement in recent weeks after being adversely affected by unusually cold and wet weather in the south and mid-west marketing areas." He predicted that with improved weather conditions throughout the country, fertilizer sales will show a sharp increase during the second quarter, with deliveries limited by ability to move the tonnage during a relatively short planting and cultivating period.

Albert E. Forster, president of Hercules Powder Co., was quoted by the *Wall Street Journal* in another article as believing that "the bottom of the business decline has been reached or will be reached soon." He indicated that his company's index of incoming orders has quit going down and stabilized in late March. He added that ammonia sales have been "hard hit" because of poor weather that caused lessened demand for agricultural chemicals.

AC

Insect Model Co., a firm in Fairmont, W. Va., has come out with a line of entomological models that includes a 13 inch flea. The highly-colored models are made of papiermache. Said to be extremely realistic, they are hand made and can be used to illustrate lectures and in advertising. The 14-inch soldier termite can be expected to stop traffic at any display. A roach measures 11 inches and rats come in two lengths, 10 and 15 inches.

AC

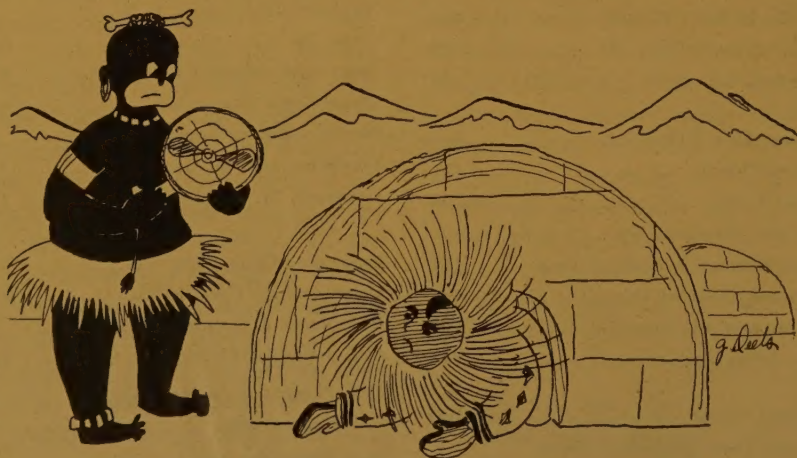
A television program prepared jointly by NACA and the USDA was released early in March for showing on 80 television stations. It stresses the economic benefits to be obtained by using pesticides on the farm.

AC

It's a 25th anniversary for NACA this year. An excellent program is reported in the planning stage for the 25th anniversary convention which will be held at the Bon Air Hotel, Augusta, Ga., October 29-31.

AGRICULTURAL CHEMICALS

Sales Resistance . . . Break It Down with Advertising



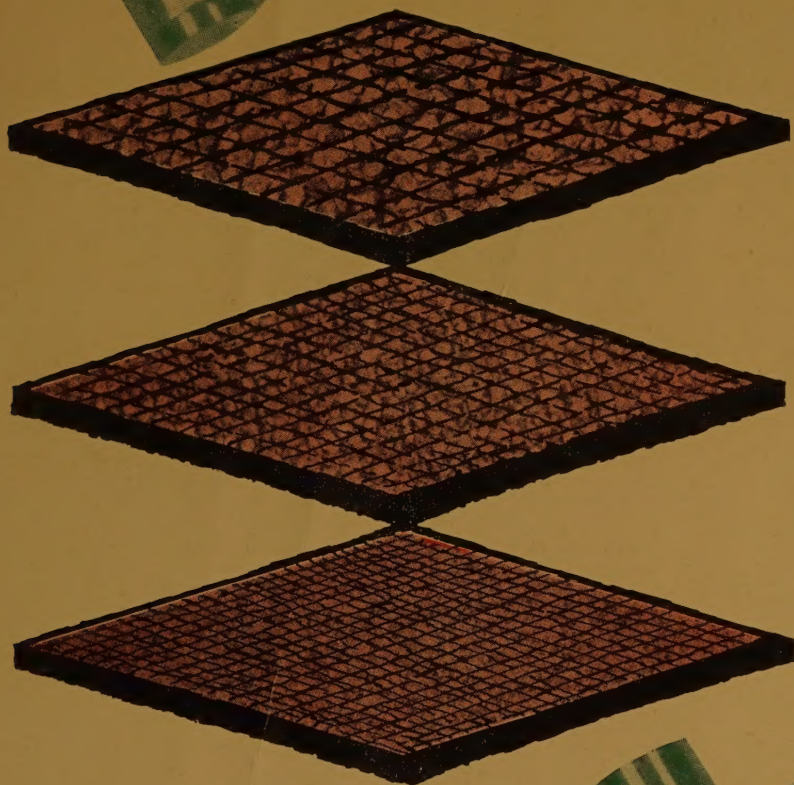
YES, you can help break down even the toughest sales resistance with a regular month after month sales message in a magazine that is read by your potential customers. The top magazine to reach your customers in the agricultural chemical field is, of course,

AGRICULTURAL CHEMICALS

Caldwell

New Jersey

Member Audit Bureau of Circulations



NATIONAL POTASH OFFERS PRECISION SCREENING

*From the newest and most modern
potash refinery, NATIONAL brings
precision screening to the
fertilizer industry.*

*Order a car today of our Standard
or Coarse muriate for a more uniform
and free flowing product,
and test this superior potash
in your mixed fertilizer.*

Telephone, wire or write to:

NATIONAL
POTASH COMPANY

205 EAST 42nd ST. • NEW YORK 17, N. Y. • ORegon 9-4950
212 Bell Building • MONTGOMERY, ALA. • AMherst 5-8234

Best Grain Protectant

A Single Application of Pyrenone*

Protects Stored Grain All Season Long

No insecticide available to farmers or elevator operators is more effective or more economical than Pyrenone Wheat Protectant.

One application, as the grain is stored, will *prevent* insect infestation during a normal storage season. It's the same with Pyrenone Grain Protectant — a special formulation that repels repeated insect attacks of corn, popcorn, buckwheat, barley, rye and rough rice.

Easy to apply in dust form or as a protective spray, the Pyrenone Protectants have been certified by government authorities as being completely *safe*, when used according to directions.

Active ingredients of Pyrenone are technical *piperonyl butoxide* and *pyrethrins*.

Under recent federal legislation, popularly known as the Miller Bill, approved tolerances have been granted for *piperonyl butoxide* and *pyrethrins* —when applied to stored grain.

For immediate supplies of Pyrenone, see your local dealer—or contact Fairfield Chemical Division, Food Machinery and Chemical Corporation, 1006 Grand Ave., Kansas City 6, Mo. Branches in Principal Cities. In Canada: Natural Products Corporation, Toronto and Montreal.

*Reg. U. S. Pat. Off., FMC.

Pyrenone

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Fairfield Chemical Division

Sales Headquarters

441 LEXINGTON AVENUE, NEW YORK 17, N. Y.

